PURCHASING

JANUARY, 1940 . . . . . CONTENTS

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R v.8 Jan—June 1940

Purchasing in 1940

REAMS of predictions have been written concerning the business outlook for 1940. The basic factors have been repeatedly indicated—the known facts, the variables, and the elements of uncertainty. It is not surprising that there should be some divergence in the conclusions drawn from this data. The significance lies in the points on which there is general agreement.

From the purchaser's viewpoint there are three conditions of particular importance to be noted.

1. There will be no sharply defined change to a seller's market in 1940. The impetus in that direction has already passed its peak and settled to a new economic balance. Producers are in a better strategic position than heretofore, but buying policy is still a major consideration. That places a clear and very serious responsibility upon buyers to help maintain a reasonableness in markets and inventories necessary to sustained industrial health.

2. Conceding an honest endeavor on the part of all industry to achieve stability, and with a satisfactory overall record of production and consumption in prospect for the year ahead, there is a strong likelihood of rather wide fluctuations along the way. Observers are in reasonable agreement as to the sum total of the year's business, at approximately the 1939 level, but their charting of the course to be followed is not so uniform. Close attention to all factors and a flexible buying policy will be required to conserve values for the individual company and for industry as a whole.

3. There will be renewed emphasis on volume. But while it is true that volume of production and sales are necessarily a reflection of purchase volume, there is a significant difference. Volume is a direct measure of production and sales accomplishment, but in purchasing the manner and policy rather than the tonnage and dollar value are the measure of success.

1940 is a year of opportunity, and no one in the whole industrial organization has a greater opportunity to do a sound and constructive job than the purchasing executive.

Stuart F. Heinritz

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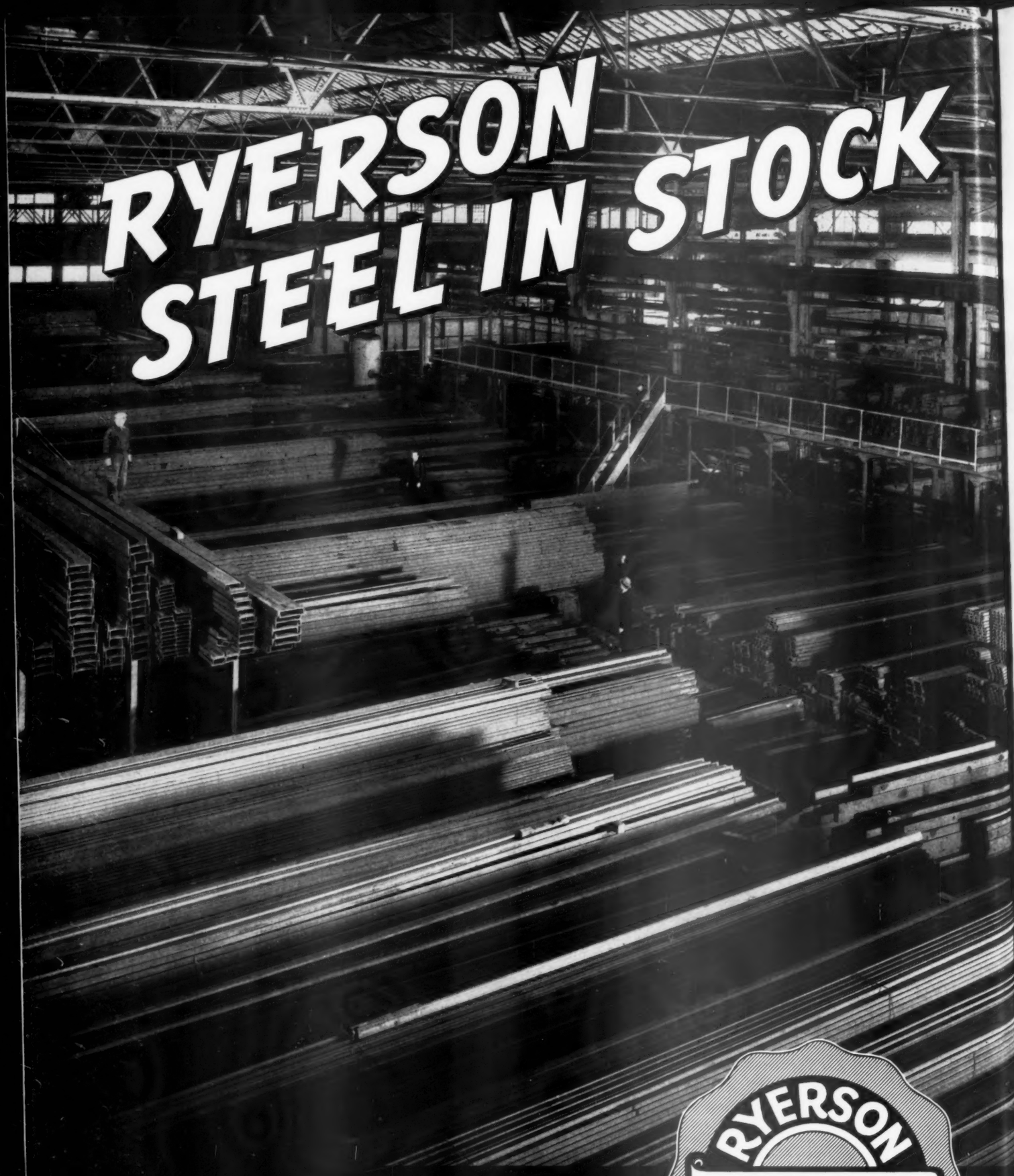

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INVENTORIES... HIGH or LOW?

THE OUTSTANDING missing link in the great chain of statistical and economic data available today is the important factor called inventories. The question, "Are inventories high or low?" is now causing more worry in this country than the war. Considerable information is available portraying current stocks at primary points over a long period of years. This is made possible through the co-operation of raw material producers. However, statistics covering the important phase of stocks on hand in wholesale and retail channels is a radically different story. One reason for this is that it is extremely difficult to gather sufficient information to indicate a true trend. Furthermore, there is reluctance on the part of consumers to issue confidential data on the premise that if the producer knows definitely the exact status of stocks in distributing channels, he may use this information as a club over sales policies or change trends to fit the position of stocks.

It is difficult to construct a house without proper building materials, and as the purpose of this discussion is to throw some light on the inventory situation, it will naturally be necessary to use some substitutes and reach conclusions in more or less an indirect manner. In other words, there is bound to be a certain amount of supposition. However, facts are facts in anyone's language, and the following tells us in no uncertain terms that the inventory situation today is not critical.

Before delving into the statistical aspects it is important to briefly review the change which has transpired over the course of the past decade and a half in regard to the practice of maintaining inventory reserves. The story opens with the so-called profitless prosperity era of 1922 through 1929. During this period the physical volume of production steadily maintained a position above the normal line. Industry had adopted mass-production, rapid-turnover, small-profit-margin principles. Little thought was given to the ultimate collapse, and consequently, inventories were held more or less on a maximum basis. However, when the stock market struck twelve in October, 1929, signaling the beginning of the general collapse, no one had any conception of the magnitude and intensity of the depression which was ahead.

By early 1931, however, terrific losses had been encountered through the contraction in the value of inventories in general. The situation became more intensified in 1932. Naturally, businessmen were taught a severe lesson during that hectic period, and because human nature never changes, a program diametrically opposite to the one noted during the profitless prosperity days was generally employed through the first six years of the acute depression. Despite the fact that the commodity

By
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price trend reached low ebb in early 1932 and subsequently advanced, there was no general change in the policy of maintaining minimum reserve stocks.

The next important change in inventory practice occurred in 1936. Commodity prices were rising along with wage rates, and purchasing agents, following the line of least resistance, immediately scrambled to build up reserves as quickly as possible. The net result was a miniature boom that lasted well into 1937. The upswing was altogether too rapid to be economically healthy, and was not based on sound economic principles. Hence, the subsequent collapse was even more abrupt than the recession directly following the termination of 1929. Heavy stocks built up in early 1937 showed a material loss by the end of the year.

Since early 1938, few have ventured to tread on thin ice, and when stocks accumulated during the temporary boomlet of late 1936 and early 1937 were eventually absorbed, the general policy was to stick close to shore as regards aggressive buying. Therefore, when warfare suddenly loomed up on the horizon in early September, 1939, stocks of basic raw materials in the hands of producers were not in any sense burdensome. Inventories in wholesale channels were limited. The basis for this statement is noted in the volume of business transacted since late 1937, in carloadings, in truckloadings and in the general attitude of conservatism.

In early September, stocks in retail channels were also subnormal, and the only verification of the fact that supplies were low and broken is readily observed by the great endeavor on the part of retailers during the past three months to rebuild supplies. The greatest tidal wave of aggressive buying on record took place in September and October. The volume of new orders outstripped actual production by a tremendous margin. Even today after five months of rapidly expanding output, mills and factories still have a substantial backlog of unfilled orders.

The records show that industry met the challenge of unprecedented demand with banners flying. Practically over night mass-production and rapid-turnover principles were adopted, made possible by the availability of widespread idle producing capacity. Carloadings, in the final quarter of 1939, reached the highest level in nine years, and the volume of merchandise delivered by trucks reached new peaks. Now that the initial siege of buying hysteria is over, the fact that industry experienced little difficulty in coping with the tidal wave of aggressive buying is almost in the category of a miracle. The way matters now stand there is absolutely no danger of any short-

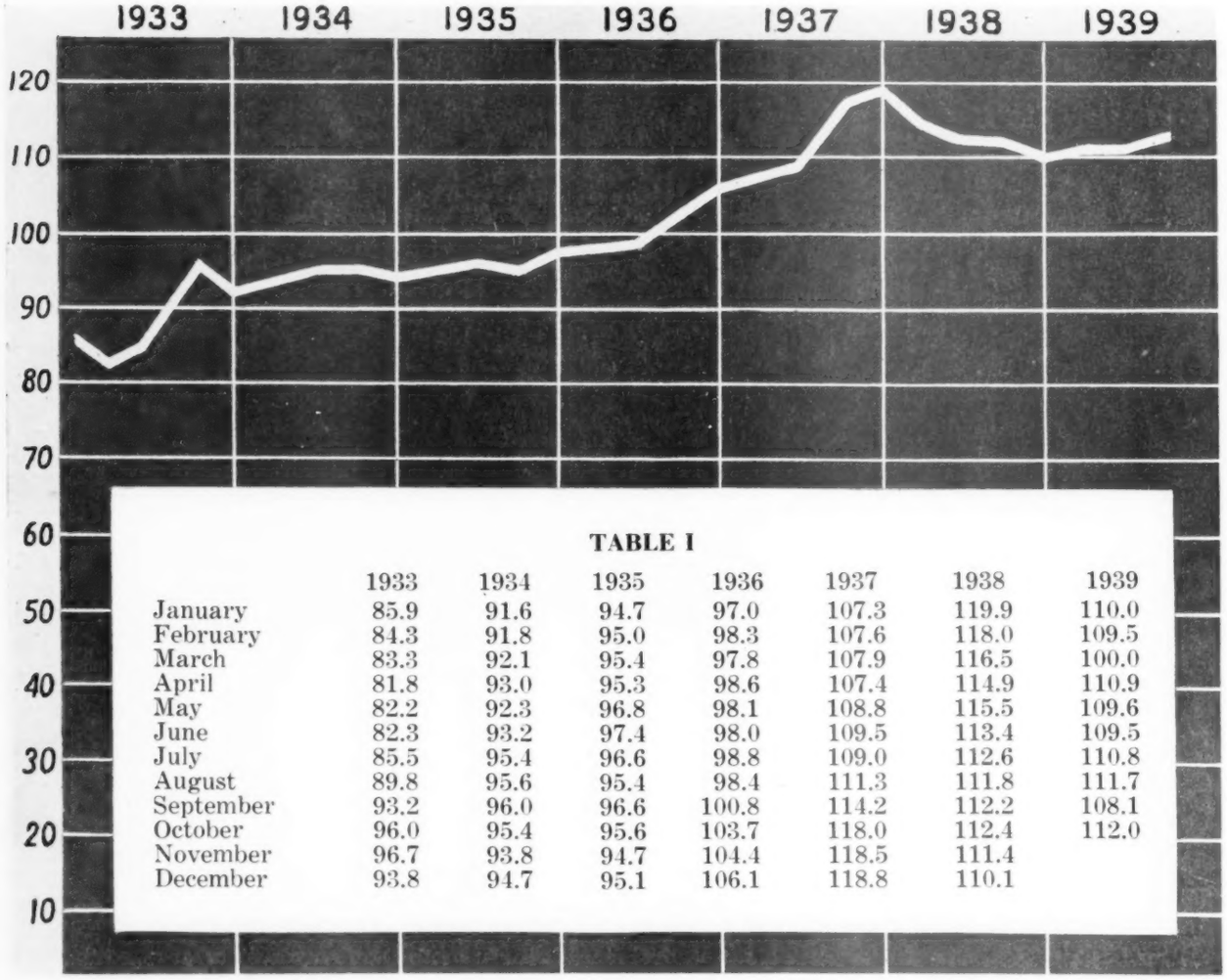


TABLE I

	1933	1934	1935	1936	1937	1938	1939
January	85.9	91.6	94.7	97.0	107.3	119.9	110.0
February	84.3	91.8	95.0	98.3	107.6	118.0	109.5
March	83.3	92.1	95.4	97.8	107.9	116.5	100.0
April	81.8	93.0	95.3	98.6	107.4	114.9	110.9
May	82.2	92.3	96.8	98.1	108.8	115.5	109.6
June	82.3	93.2	97.4	98.0	109.5	113.4	109.5
July	85.5	95.4	96.6	98.8	109.0	112.6	110.8
August	89.8	95.6	95.4	98.4	111.3	111.8	111.7
September	93.2	96.0	96.6	100.8	114.2	112.2	108.1
October	96.0	95.4	95.6	103.7	118.0	112.4	112.0
November	96.7	93.8	94.7	104.4	118.5	111.4	
December	93.8	94.7	95.1	106.1	118.8	110.1	

age and this is not only true of domestic commodities, but also on products of foreign origin.

There are just two points that should be emphasized at this time. One is that, generally speaking, there is still considerable surplus producing capacity available. Second, there is also an adequate supply of labor.

So much for generalities. Let us now consider data of a concrete nature. First of all we are presenting Table I, constructed by the National Industrial Conference Board, showing the index of manufacturing inventories—finished goods—adjusted for seasonal variation, 1936 equaling 100.

A casual glance clearly tells the story of what happened in late 1936 and throughout 1937, the subsequent let-down and the beginning of another upswing starting in October of 1939. Certainly, the percentage increase in inventories of finished goods was far from radical during the month of October. November will unquestionably show a further increase, but still the current level promises to hold under the peak of late 1937 and the opening month of 1938. Remember that the year 1936 equals 100, and therefore, the low figures noted in 1933 and 1934 should not be used either as a base or a criterion. Inventories today are well above the base year, but due consideration must be given to natural growth, the fact that business is entitled to some degree of outstanding activity following a decade of acute depression, and finally, warfare automatically brings its inevitable repercussions.

Table No. I also shows that inventories of finished goods have not accumulated at points of origin but have moved rapidly into consuming channels. This is a vital point because even though it is not definitely known whether ultimate consumption is keeping pace with actual production, yet at least stocks in manufacturers' hands are not mounting by leaps and bounds.

Today industrial activity is comparable with the peaks of 1929. New production records have been hung up in many lines, and it would be like hunting for a needle in a haystack to note any industry that hasn't responded from a limited to a great degree to the recent spurt accelerated by war psychology. Table II is of interest as it shows the approximate production of many important lines for 1939 as compared with former peaks. The 1939 record naturally takes into consideration the great stimulation of the final quarter.

TABLE II

(000 omitted)

	1939 Approximate production	Peak Year Volume	Peak Year Date
Cattle Hide Leather	22,060	22,628	1936
Rosin, bbls.	1,700	2,166	1927–28
Turpentine, bbls.	500	650	1927–28
Rubber (imports) tons	471	585	1937
Bituminous Coal, tons	394,815	579,386	1918
Fuel Oil, bbls.	472,344	458,770	1937
Gasoline, bbls.	612,799	571,727	1937
Petroleum, bbls.	1,265,559	1,279,160	1937
Ferro-manganese, tons	240	336	1929
Lead, tons	488	696	1926
Quicksilver, flasks	20	36	1917
Steel, tons	46,004	54,850	1929
Pig Iron, tons	31,265	42,286	1929
Zinc, tons	533	638	1926
Cement, bbls.	120,906	175,968	1928
Glass, sq. feet	129,660	198,072	1936
Cotton, bales	11,792	18,946	1937

IN EACH instance there is considerable distance to go before the records of former years are equalled. After all, no industry desires overproduction. It is a mistake to progress on the premise that the perpendicular rise in production chronicled during late 1939 is indicative of an industrial boom that will quickly move out of the realm of control. Already there are signs of a tapering off movement, and it stands to reason that industry will do everything in its power to hold the volume of output during 1940 as close as possible to the volume of consumption. We predict that when the curtain goes down on the new year 1940 the total volume of business transacted, which means in essence, the aggregate volume of production and consumption, will not vary much more than 10% over 1939.

What every businessman is concerned about is the ability of consumption to keep pace with output and the necessity of keeping inventories within bounds. It is true that reserves of many basic commodities are today well above average. Likewise, there is an important group where stocks are considerably lower than average. We are therefore presenting a table which portrays the latest stock figure available as compared with the previous averages and with the largest stock figure ever chronicled.

TABLE III Present Stocks Above Average (000 omitted)

	Latest Figure	1929-38 Average	1924-28 Average	Peak	Date	% Increase over 10-yr. Average
Cement, bbls.	19,868	19,456	11,621	30,928	May. 1930	2%
Cotton, in cons. estab. bales	16,933	10,550	5,986	17,291	Nov. 1938	61
Cocoa, bags	1,055	708	174	1,429	June 1939	49
Butter, cold stor. hold. lbs.	89,752	88,594	80,435	175,476	Sep. 1933	2
Cheese, tot. holdings, lbs.	112,211	99,980	80,789	150,248	Sep. 1938	12
Lard, cold stor. hold., lbs.	88,540	63,973	45,915	224,476	Sep. 1933	38
Ethyl alcohol, gallons	17,974	16,950	7,913	35,176	Aug. 1938	6
Glycerine, C.P., pounds	45,965	15,463	6,652	51,210	June 1939	198
Rosin, bbls.	631	308	202	679	Sep. 1939	105
Sulphite Pulp, tons	98	68	5 yrs.	133	Mar. 1938	44
Sulphate Pulp, tons	31	13	5 yrs.	48	Feb. 1939	148
Cottonseed Oil, crude, lbs.	490,215	451,335	244,689	843,167	Apr. 1934	9
Linseed Oil, lbs.	112,475	106,308	97,779	241,951	Mar. 1928	6
Olive Oil, edible, lbs.	5,114	3,996	5,770	9,699	June 1922	28
Peanut Oil, refined lbs.	25,925	8,174	1,255	34,065	June 1937	217
Tallow, edible, lbs.	232,064	200,422	67,547	309,127	June 1935	16
Coal, Ind. stocks, tons	40,977	34,883	54,249	77,455	Mar. 1927	17
Gas & Dist. Fuel Oils, bbls.	61,388	44,233	29,616	61,388	Oct. 1939	39
Gasoline, bbls.	43,516	34,255	31,134	60,043	Mar. 1938	27

Present Stocks Below Average

	Latest Figure	1929-38 Average	1924-28 Average	Peak	Date	% Decrease from 10 yr. Average
Silk, bales	42	60	50	97	Dec. 1933	—29%
Wool, lbs.	118,054	151,767	5 yrs.	192,345	Sep. 1934	22
Coffee, bags	845	877	716	2,948	Apr. 1917	4
Pork, cold stor. hold. lbs.	332,357	411,854	416,471	1,009,882	June 1918	19
Cattle Hides and leather	12,489	15,588	17,039	26,119	Jan. 1922	20
Turpentine, bbls.	93	99	61	145	Dec. 1935	6
Ground Wood Pulp, tons	49	60	— — —	95	May 1938	20
Rubber, tons	233	324	— — —	429	Jan. 1933	28
Chinawood Oil, lbs.	33,752	39,314	19,219	62,142	Sep. 1938	14
Petroleum, bbls.	197,330	307,425	331,233	386,365	Sep. 1929	36
Paraffin Wax, crude, lbs.	61,860	91,864	8 yrs.	198,122	Nov. 1930	33
Lead, tons	74	158	9 yrs.	240	July 1934	54
Zinc, tons	62	99	27	150	June 1938	38

In the former group, while the latest stock figure varies from 2% to 217% above the previous ten-year average, yet in only one instance—namely, fuel oil—are stocks at present of all-time record proportions. In the second group, thirteen important items are shown as now maintaining stock reserves ranging from 4% to 54% below the previous ten-year average and radically under former peaks. Based on the underlying story which these figures reveal, it is logical to summarize the study of basic raw materials at primary points with the statement that, by and large, reserves are not of exorbitant proportions, nor are they currently increasing at a sensational pace. Briefly, stocks of basic raw materials at the source of origin on the average are in no sense critically high.

REFERENCE was made and statistical series presented earlier in this discussion which indicated that inventories of finished goods had not chronicled any outstanding increase in manufacturers' hands since September 1. The only phase now needed to clarify the situation is the exact picture as to the status of inventories in the hands of distributors—wholesalers and retailers. In the absence of concrete evidence we are presenting our impression of what has taken place.

Remember that on September 1 supplies of merchandise throughout the country were low and broken, ruling far under the normal complement. War and rising prices represented a sufficient nucleus to justify aggressive buying. The initial demand was practically unprecedented in scope and as we have already pointed out, industry was equal to the occasion. Hence, in the short space of a few months inventories in distributing channels have been rebuilt and are now closer to normal proportions than at any time since 1937. Based on personal interviews and a handful of letters from points throughout the country, wholesalers and retailers plan on a program of maintaining normal reserves, but it is a rare occasion where we have found that distributors are willing to discount the future by buying at random or on an unorthodox scale. The idea is to keep ample supplies on hand but not to overdo it.

That this situation truly represents the inventory practice on the part of the wholesaler and retailer is borne out by the contraction in the volume of orders being placed since the peak levels reached in September and October. The volume of new orders is now back on a safe and sane basis maintaining a course which is more or less in alignment with the current stage of the economic cycle. Incidentally, the abolition of hysterical buying has also been accompanied by the elimination of ruthless speculative activity.

Sufficient time has elapsed to prove quite conclusively to consumers that there is not a great deal to worry about as regards production. No difficulty will be experienced in obtaining adequate supplies. Now we are entering a testing period, and as 1940 progresses more evidence will be available indicating the ability of ultimate consumption to keep pace with the higher levels of industrial output.

The fact that production readily coped with the initial extensive buying wave is not the only

Continued on page 93

Striking use of stainless steel in architectural design at the New York World's Fair. The heroic figure of Mercury is welded of stainless sheets; door trim is of same material.

Photo by courtesy of International Nickel Co.

New INDUSTRIAL MATERIALS ARE READY *for* 1940

GEORGE S. BRADY

Author of Brady's "Materials Handbook"

WHILE it is impossible for a purchasing executive to be an expert in the myriads of varieties and grades of industrial materials now available and continually coming on the market, he must, like the astronomer, avoid becoming confused by these whirling galaxies and be expert on the high points—the general purposes, basic movements, trends in research for new materials, and natural laws pertaining to materials and their markets. Now that the world's markets for many basic materials are disturbed by war conditions, it seems more than ever necessary to have at his finger tips these high points. In this article it is proposed to review the trends in materials during the year just closed, with their possible effects on the future, rather than to attempt to give detailed data on any particular materials.

New Finishes

It will be remembered that the introduction of lacquers in 1921 completely revolutionized automobile finishing during the two years following, and that lacquer finishing then swung its course into every other mechanical industry down to toys. Something like that is again occurring. Automobile makers are turning to baked synthetic finishes. These finishes are tougher, stand more abuse, stick better to the metal, and have good hiding power.

The alkyd-type resins are among these. They can be baked on in twenty minutes at 175 deg. F. The chances are that hundreds of other products may benefit by this type of finish. It is going to require also the purchase of new baking equipment in most cases. Incidentally, chromate primers for painted metal surfaces took a leap ahead this last year. The Navy has adopted them. The contention is that any undersurface moisture de-

posits out the chromium and prevents underfilm corrosion.

While on the subject of finishing it is well to note the trend in metal coloring by chemical baths. Metal coloring is one of the oldest arts, but recent work has been on a highly scientific basis, the laboratories getting down to solving definite problems and depositing finishes with definite properties.

In some cases bar stock can be purchased with the finish already on. A case in point is ebonized Monel metal. A lustrous black, non-tarnishing and good-wearing finish can be procured on the commercial stock. In other cases product manufacturers will have to set up tanks to finish the articles after manufacture. This means acid and alkali-proof equipment and the purchase of chemicals not ordinarily procured in machine shops and plating departments. The white finish on aluminum articles, as an example, is being done with a bath of calcium sulphate and calcium oxide. The new alumetized steel, on the other hand, is an outgrowth of liquid-metal spraying which has come into increasing use. The aluminum is sprayed on the iron or steel and then heat-treated so that the aluminum alloys with the iron.

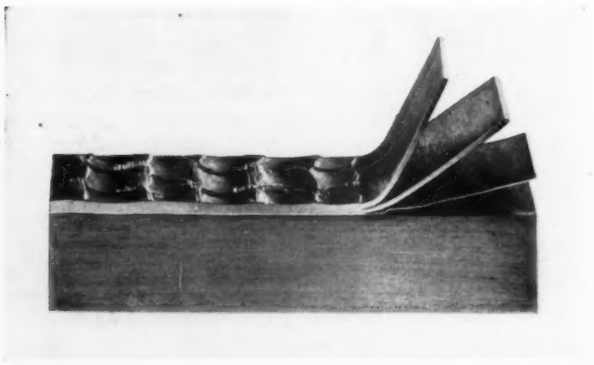
Synthetic Rubber Substitutes

Tank linings to withstand acids have been a problem. Goodrich has recently finished some tests on tanks lined with its Koroseal. This material has withstood for two years a mixture of hydrofluoric and nitric acids, one of the hardest combinations to beat. This past year aircraft manufacturers were confronted with the problem of finding a lining and gasket material that would withstand benzol-gasoline, used entirely on French aircraft. Special compounding of duPont's Neoprene in solution did the work. Neoprene in solution is not an easy thing to handle because it cures even in the can, but it is mixed on the job and when a coat is properly cured gives a film with no dangerous swelling.

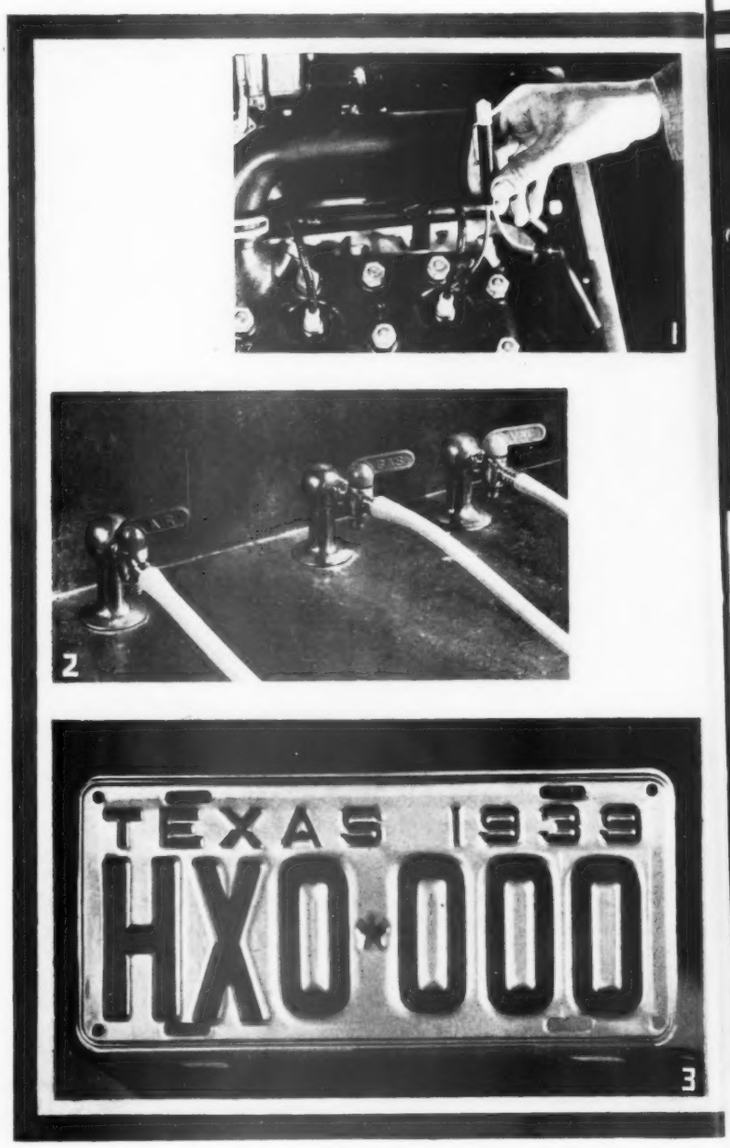
The synthetic rubber substitutes came out of the cocoon stage this year. Their relatively high prices have been against them. Estimates are that Germany produced 25,000 tons of Buna synthetic rubber, nearly half its requirements for rubber, but Germany because of its government control and allocation system, does not have to pay attention to the cost factor on strategic items.

Two developments this year brought American synthetics to the front commercially. One was the uncertainty of the rubber market due to difficulties of importation and the rising price. The other was the success of research studies to reduce the price of synthetic rubbers. DuPont introduced a new polymer in its Neoprene that will be lower in price. In fact, this polymer is practically odorless and will save the expensive operation of deodorizing, a process that is under patents held outside the corporation. Rubber itself has a none-too-sweet odor, but over the years people have become accustomed to the smell of rubber. Odorless synthetics should have a quality mark-up over natural rubber, especially for coated textiles.

On the matter of synthetic rubbers, it must be remembered that none of them are chemically rubber. They are "rubber like," and have many of the mechanical properties of rubber. But each of them also has distinctive properties, some of which have decided advantages over natural rub-



The Babcock & Wilcox Company's "Croloy" bonded plate has an alloy veneer of known and uniform thickness obtained by electric resistance welding two or more thin rolled sheets of chromium alloy to a relatively inexpensive base plate of carbon steel, with a sheet of nickel between.



ber, particularly the items of resistance to aging and to chemicals. The art is still new, and the compounding of these synthetics is still in its infant stages, but a number of important laboratories, apart from those of the producers, are digging deeply into compounding research.

For solution products, such as adhesive cements and fabric-coating materials, the synthetics have only price against them. Neoprene cements are stronger, tougher, and more oil-resistant than rubber, but the price has been triple that of high-grade rubber cements. Work on Vistanex, the American version of a German development, also shows this synthetic as having advantages over rubber for solution products. This year, with rubber prices upward and synthetic prices downward, an approach to the rubber-cement price is being made.

Substitutes for Tin

Tin is a strategic material, that is, it is procured overseas and is not available in emergencies in required quantities. The Government is building up a stockpile of tin concentrates recently authorized by law, but that will have no immediate effect on commercial markets. The big quantity use is, of course, for tin plate, and there are no outstanding new developments to reduce the requirements of tinplate for food containers. The best bet for the near future is aluminum-coated steel. One difficulty with this and with lacquer-coated tins is the problem of soldering. It is known, however, that food companies are working on the problem, and the answer may be in new can-welding machines.

Hafta Handelsgesellschaft has recently been very successful with its plastic tubes to replace tin collapsible tubes. It has been quoted as saying that food cans may be made shortly of plastics. They will be transparent, and this will be an advantage. Glass containers are liked on the American market, but they have the great disadvantages of heavy weight and difficulty of disposal of the discarded container. Plastics are only one-third as heavy as metals, and the disposal is easier than with metals.

Tin for bronzes covers a much wider application and affects more industries, but fortunately there has been such recent progress in bronzes that contain little or no tin that the purchasing department in a pinch can send almost any requisition for tin bronze back with a request to solve the problem with some other material.

Tin as a hardener and crystal-forming element in bronzes can now be replaced in various ways. Nickel and silicon together form a hard crystal in bronzes. Also, the newer silicon bronzes, many of which incorporate several other alloying elements, are tougher, stronger and harder than

(At right) Nickel-chrome steels are specified for 275 parts in this dial type milling machine manufactured by the Cincinnati Milling Machine Co. Gears and other components subject to wear are of case-hardening steel, while spindles, shafts, levers, bolts and studs are of the oil-hardening steel.

Plastics continue to find new and useful applications in industry.

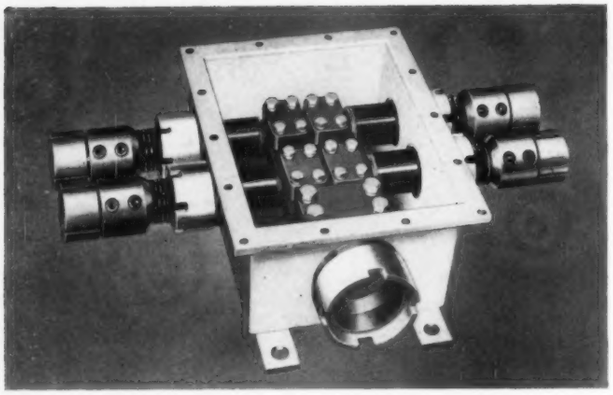
1. A safe and convenient tester and polarity indicator for electrical and radio circuits. The neon indicator bulb is fully enclosed and protected with a Bakelite polystyrene housing, clearer than glass and non-fragile.

2. Molded hose-cock handles are chemical resistant, unaffected by strong acids and alkalis. A wide range of contrasting colors promotes safety by lessening the danger of opening the wrong valve.

3. Colored enamels having a 100% Bakelite resin base for the gum content are used on Texas automobile license plates.

4. An intricate one-piece injection molding made it possible to improve the design of this indicator for checking flue gas concentration.

5. The severe service conditions encountered in textile processing equipment are solved by the use of heat-hardenable resinoid varnish to impregnate weaving, spinning and twisting bobbins.



Underground boxes for housing cables, wire and switches offer longer and superior service when fabricated of nickel-chrome stainless steels. The one shown above is of Republic Steel Corporation's "Enduro." It is high in corrosion resistance, non-magnetic, and combines strength with thinness.

tin bronzes. Beryllium bronze continues to grow in use. One producer this year added nickel to refine the grain and increase ductility. This bronze, with 2.25% of beryllium, 0.50 nickel, and a small amount of iron, can be hardened up to 360 Brinell with a tensile strength approaching 200,000 lb. per sq. in. Beryllium-nickel is not yet on the market, but can be obtained on special request. One mill, using both beryllium and manganese in its nickel, has produced an alloy for springs that surpasses anything in bronze for torsional endurance and fatigue resistance.

But no one wants to eliminate tin entirely simply because it is hard to get. An important new use for tin is that of tinning pistons for aircraft and automobile engines. The tin is plated on and increases efficiency greatly. The swing to tinned pistons and rings is now in progress. In the meantime attention is being given to new methods of extraction of tin. Cassiterite, the ore, is a widely distributed mineral, but so far it has been found in commercially-workable deposits in few places in the world. Italy has just discovered a new commercial vein in Italian Somaliland, and there are known deposits in Canada and Alaska if improved extraction methods can be devised.

Metallurgical Progress

Automotive plants have been dropping alloy steels and turning to high-manganese (1.30 to 1.90%) steels. A key-note of this year's metallurgical convention was the influence of minor constituents in steels and the growing importance of high-purity metals. On the other hand a new copper-silicon steel is being used for aircraft landing-gear assemblies. It contains 1.5 to 2.0% of copper, and 1.0 to 1.25% silicon, with high manganese, 1.35%. A feature is great fluidity to form excellent castings.

Leaded steel in bar stock is another new item. Lead does not allow with iron, and the lead occurs in finely-divided particules and strings. Some regular SAE steels have recently been marketed containing lead. From 0.15 to 0.30% increases machinability greatly, and does not impart the unfavorable characteristics that are given to steel by sulphur or phosphorus. In fact, it is claimed that in properly made leaded steel the lead is in such a fine state of dispersion that it cannot be detected under a microscope. It costs more per pound, but the saving is made in machining costs, which is a factor of growing importance now that skilled machinists are becoming scarcer.

Along the line of high-purity metals, at least two foundries have recently featured cast iron with twice the tensile strength of ordinary iron, claiming that the improvement is obtained by controlled methods and not by alloying. This means that the day of the foundry with the backyard junk yard is over, and orders for iron castings should best be given to foundries with scientific methods.

Composite Sheets

Another recent trend in steel is towards the composite sheet with an alloy face and a soft steel base. The chief use is for chemical-resistant equipment, especially tanks and stills. An 18-8 stainless steel costs about fourteen times more than plain carbon steel, and since there is also a saving in machining the plates, the final saving is likely to be great.

But composite plates and sheets must be perfectly bonded, and so far the bonding has been by rolling. In other words, the bond is by adhesion rather than by cohesion. Attempts are now being

Continued on page 92

Turning an alloy steel casting with a Kennametal-tipped tool. Diameter of work, 30 inches. Depth of cut, 5/16" per side; feed per revolution, 1/32". Speed, 180 ft. per min., rpm. 24.

The INHUMAN ELEMENT

By RUSSELL B. WILLIAMS

IN just about every mill, factory and other industrial activity they have what is called the human element. It is a very convenient thing to have. When the whole operating system goes into a state of cramps, the "human element" is always trotted out to explain why it happened.

People just don't function perfectly on all occasions. A strange peculiarity of our nature—but actual, nevertheless. Machinery and equipment are made to operate properly—barring, of course, the "human element" that goes into the making of this machinery and equipment. Sometimes these machines and pieces of equipment just can't adapt themselves to the style of the men using them. It's the *in*human element against the human. Not hard, at all, to pick the winner.

This "human element" is a very contrary and unpredictable thing. It doesn't make sense. But I claim it is a greatly overworked quantity. The "*in*human element" should take its share of the load.

Recently a man in charge of important manufacturing operations showed me the record of his company's experience with wire rope. There just wasn't any consistency in it. Performance figures roamed all over the charts. One rope would last three or four times as long as another. The average, in the light of later experience, was low.

This man was inclined to lay the whole mess in the laps of the men using the ropes. I differed with him. It seemed to me that the trouble wasn't so much with the men who used the ropes as with the ropes the men used. I thought that the "*in*-

human element" was the thing that needed improving.

This man started using a different brand of rope—of the preformed type. The first few ropes that were put on the job showed up very well. He kept on using the preformed kind. The same results kept on coming. He finally got around to the opinion that this was all on account of the fact that preformed rope was able to discount the value of the "human element."

Purchasing agents, who are constantly dealing with all sorts of materials—things—can duplicate that experience many times over, in a score of fields. With all due respect to the "human element," they know that consistent and dependable results are attained only through the use of adequate materials, suited to the job. In the case noted above, it wasn't a matter of getting the kinks out of the men, but of finding a product that had in itself the characteristics that make for satisfactory performance.

If you want to be able to discount the "human element" correct the "*in*human element."

How the ALUMINUM COMPANY of AMERICA BUYS

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

• Above (right): Thomas D. Jolly, Director of Purchases and Chief Engineer.

Above: Ralph O. Keefer, Purchasing Agent.

Right: The purchasing department has aided in the improvement and standardization of packaging designs.

THE Aluminum Company of America is a vertically integrated organization, engaged in a complete industrial process from the mining of the bauxite ore to the fabrication of the metal itself into forms suitable for industrial and consumer use.

To carry out this cycle of production, the company maintains nineteen plants in fourteen states, the wide geographical distribution being necessary because of (1) the natural location of bauxite deposits sufficiently rich for economical working, (2) the large requirement of low cost fuel and electrical power used in the purification of the ore and its reduction to metallic form, and (3) the advisability of having fabricating plants established close to the major consuming markets. The importance of the last named factor will be appreciated when it is realized that this metal and its alloys are adapted to all the usual fabricating processes—casting, rolling, forging, extruding, wire drawing and cable stranding, and surface finishing—and that its industrial applications have broadened accordingly. A recent analysis showing the percentage of aluminum going into various industries in the United States shows the following:

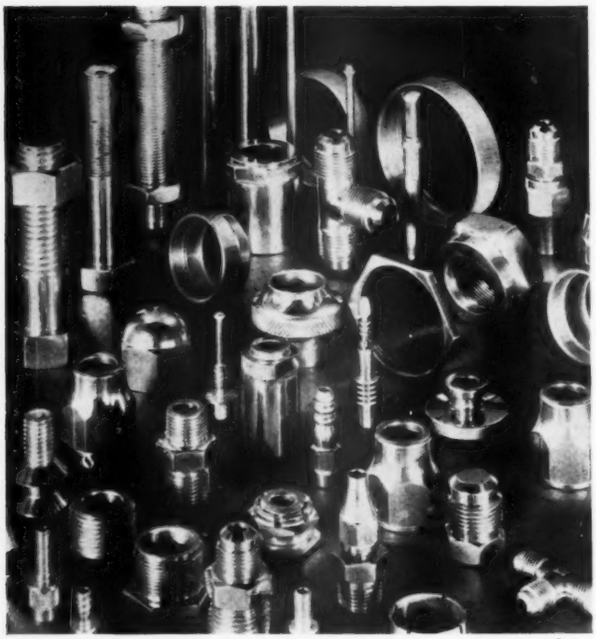
Transportation (land, air and water)	29%
Machinery and electrical appliances	15%
Cooking utensils	14%
Electrical conductor	10%
Building construction	8%
Food and beverages	6%
Iron and steel metallurgy	5%
Chemical	5%
Miscellaneous foundry and metal working	4%
Miscellaneous	4%

Three of the nineteen plants are mining operations, where the bauxite deposit is worked by open pit or underground methods, and the ore is crushed and dried.

Two are alumina plants, for the purification of the ore. The bauxite, finely ground, is digested with a hot solution of caustic soda so that the aluminum hydrate is dissolved while the silica, iron oxide and other impurities are left behind as a mud, which is separated by filtration. The aluminum hydrate is then precipitated from the solution and calcined to drive off the chemically combined water, leaving relatively pure alumina. The basic raw materials of the industry are therefore: bauxite, soda ash, and limestone, with large quantities of fuel also required to provide the heat for the process.

Four of the plants are reduction plants. Here the alumina is charged into an electrolytic cell or "pot" containing a fused bath of cryolite with other admixtures, and is decomposed by the passage of an electric current from a series of carbon electrodes suspended in the cell. It is a continuous process, the metallic aluminum collecting in the bottom of the bath and being drawn off from time to time as more alumina is added. This stage of production introduces two more important material considerations: the cryolite, which must be imported from Greenland; and carbon electrode materials. With a consumption of 0.6 pounds of carbon electrode per pound of metal produced, the aluminum industry probably manufactures and consumes a greater tonnage of carbon electrodes than all other industries. The electrode plant is an important adjunct to the aluminum reduction plant. It is a "ceramic-like" industry completely within an electro-metallurgical industry.

The rest of the operations comprise fabricating plants of various kinds and incidental service facilities such as terminal and transfer stations.



Screw machine products of aluminum, an application that is of growing importance.

This introduces the general range of factory equipment and supply purchases, as well as a considerable volume of maintenance purchases peculiar to the industry, particularly in relation to carbon electrodes, pot linings and electro-metallurgical equipment.

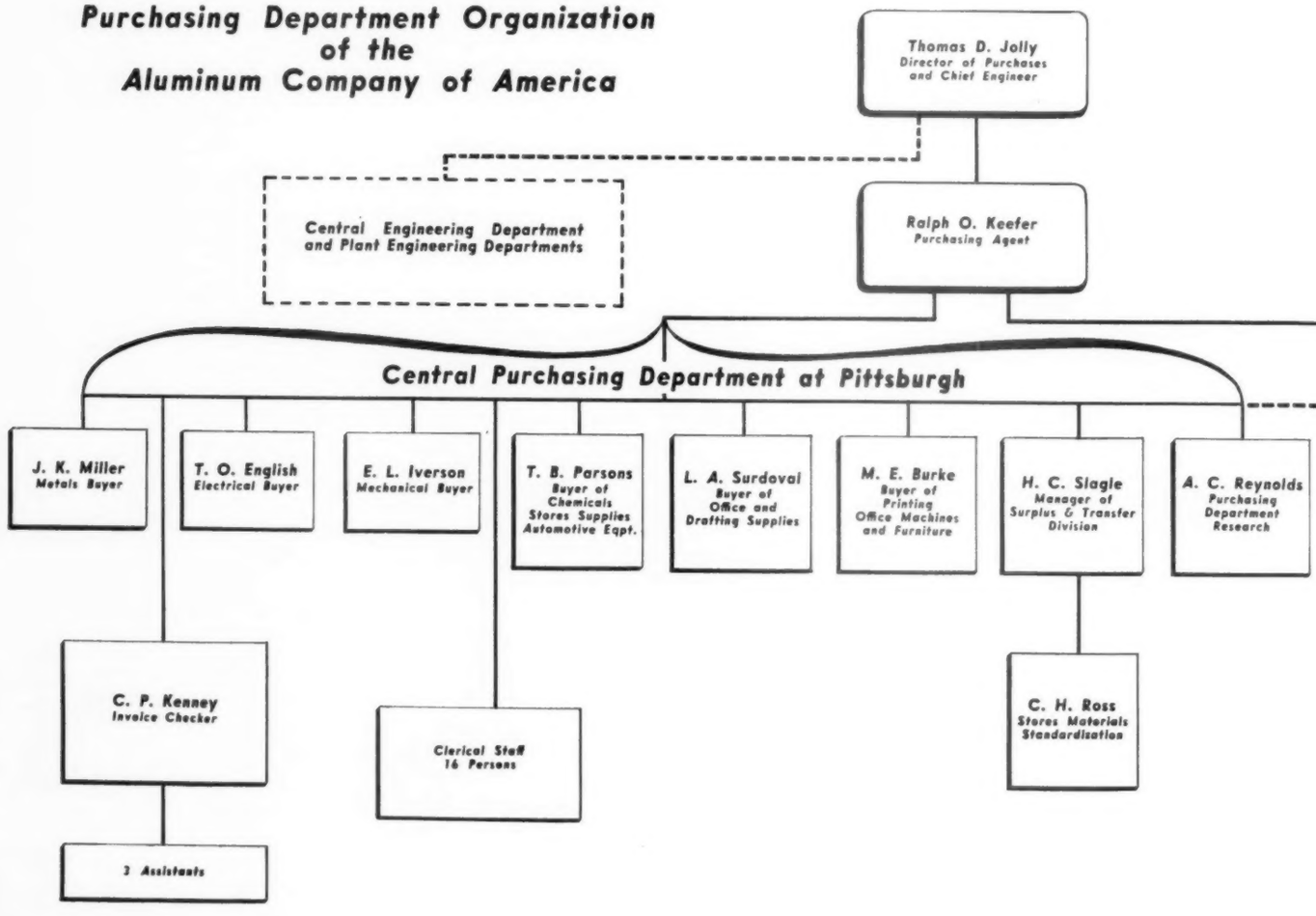
Purchasing Is Centralized

The purchasing function for this extensive organization is centralized at the company's general offices in Pittsburgh, where the Director of Purchases, the Purchasing Agent, and the staff of buyers are located. As a practical matter, resulting from geographical considerations, some buying has been localized, though policies, control, and final responsibility for all purchasing activities center in the Pittsburgh office.

Direct contact with the plants is had through nineteen District Purchasing Agents, representing the Central Purchasing Department at each of the operations. Some of these District Purchasing Agents have rather a complete purchasing organization, while in other cases the purchasing phase is handled by the local Chief Clerk, or is combined with other plant responsibilities, depending on the nature and size of the plant and its requirements. So far as the purchasing work is concerned, they are directly responsible to the Purchasing Agent at Pittsburgh. There is no general rule covering the authority of the District Purchasing Agents, the extent of this authority being defined in each case by the Purchasing Agent—a policy which prudently takes account of the laws of agency, extending ample authority for the efficient performance of their duties, yet avoiding complications which might arise from the assumption by sellers that an even greater authority is inherent in the title itself.

The Director of Purchases reports directly to the President of the company. Since 1937 he has held a dual position, serving as Chief Engineer in conjunction with his purchasing responsibility, and

Purchasing Department Organization of the Aluminum Company of America



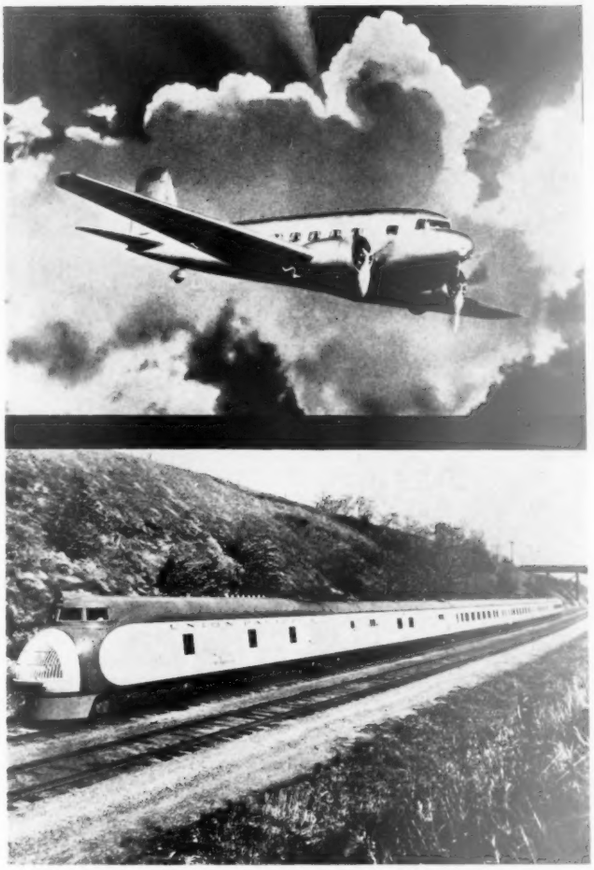
directing the work of a complete staff of construction and mechanical engineers at Pittsburgh and at the plants.

Close coordination of purchasing and engineering activities has been a characteristic of the company organization from the beginning, and the combination of these two responsibilities in the person of Thomas D. Jolly logically carries out a policy already well established. Mr. Jolly came into the purchasing department from the mechanical engineering division in 1929, as the buyer of machinery. During the five years 1932-1937, when he served as Purchasing Agent, his immediate superior was the Vice President and Chief Engineer, who had himself handled the dual purchasing-engineering position in the early days before the growth of the company necessitated a more clearly defined departmental organization.

The policy is further illustrated by the selection of the purchasing personnel, in which four factors are regarded as of prime importance: (a) technical education; (b) practical plant experience; (c) specific experience in plants of the Aluminum Company itself; (d) representation from as many different plants of the company as practicable. The advantages of building such a staff are twofold. It insures, on the part of the buyers, an intimate knowledge of the equipment and materials, and their use, as well as familiarity with the processes and the layout of the individual plants which they are serving. It provides, further, a contact and relationship between plants and purchasing department that makes for mutual confidence and cooperation. Each major plant feels that it has a "personal" representative, from its own operating organization, in the Central Purchasing Department at Pittsburgh.

Every effort is made to promote this understanding. During vacation periods, men from the plants or the central engineering division are frequently assigned to substitute at a buyer's desk, an experience that cannot fail to result in a fuller appreciation of the purchasing viewpoint. On the other hand, buyers are encouraged to visit the plants, and are expected to keep their technical knowledge up to date.

As a result of this attitude, though the work is thoroughly and definitely organized, with specific responsibilities assigned, there are no inflexible military lines of authority which would tend to raise perplexing interdepartmental issues. With the present set-up, an informal discussion of a questioned requisition, for example, usually clears the point in advance. The manual of "Standard Procedure for Purchasing," compiled in 1934, has also been a potent force for the orderly conduct of purchasing, both within the department itself, and in the relation of purchasing to other divisions of the company's operations.



Modern high speed travel is made possible by the strong, light weight aluminum alloys.

Personnel

Thomas D. Jolly, Director of Purchases and Chief Engineer, received his training in mechanical engineering at Carnegie Institute of Technology, and acquired his early industrial experience with the Pennsylvania Railroad Shops, Pennsylvania Salt Co., Northern Engineering Works, and in his own electrical business before joining the Aluminum Company organization in 1915. He has been with the company ever since, except for 18 months of wartime service with the U. S. Engineer Corps. He served successively as draftsman, machine designer, master mechanic, superintendent of maintenance, and mechanical superintendent. Appointed machinery buyer in the purchasing department in 1929, be became Purchasing Agent three years later, and was promoted to his present position in 1937. Actively interested in Purchasing Agents Association work, he was elected president of the Pittsburgh Association in 1936 and national director the following year;

20 District Purchasing Agents at

Alcoa, Tenn.	*Franklin, N. C.*
Badin, N. C.	*Garwood, N. J.*
Bauxite, Ark.	*Lafayette, Ind.*
Cleveland, O.	*Los Angeles, Cal.*
Detroit, Mich.	*Massena, N. Y.*
E. St. Louis, Ill.	*Mobile, Ala.*
Edgewater, N. J.	*New Orleans, La.*
Fairfield, Conn.	*Niagara Falls, N. Y.*

New Kensington, Pa.
Vancouver, Wash.

Purchasing starts with a requisition from the works.

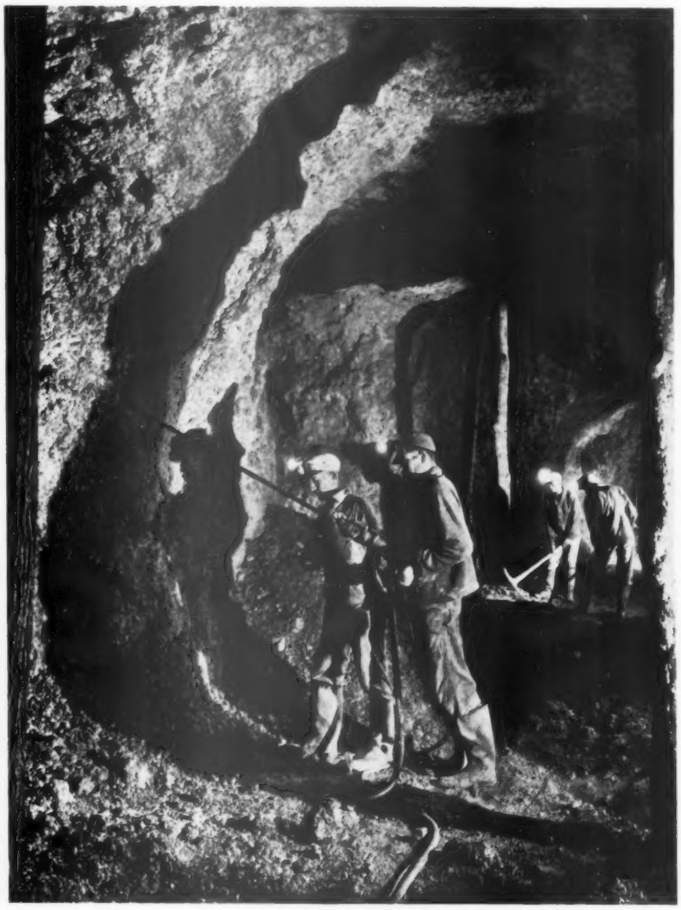
chairman of the program committee for the N.A.P.A. convention in Pittsburgh, 1937; national vice president for District No. 6 in 1938; and is currently serving as president of the National Association of Purchasing Agents. He is a member of the A.S.M.E., and served on the program committee for the International Management Congress at Washington in 1938.

Ralph O. Keefer, Purchasing Agent, is a graduate chemical engineer from Syracuse University. He started with the Aluminum Company in 1917 as an operating apprentice, and served successively as assistant carbon plant superintendent, inter-carbon-plant operating specialist, and efficiency engineer in the Reduction Department. This experience was followed by an assignment to the Central Mechanical Engineering Division, where he spent a year in designing a new carbon plant for the company. He then returned to one of the Reduction Plants as carbon plant superintendent and later became works assistant superintendent in charge of construction, mechanical engineering and maintenance at that plant. He was brought into the Purchasing Department in 1935 as Assistant Purchasing Agent, and was named Purchasing Agent two years later. Besides his technical affiliations, which include membership in Tau Beta Pi and Alpha Chi Sigma, the honor fraternities of engineering and chemistry, he has for many years been active in safety work and is currently General Chairman of the Executive Committee, Chemical Section of the National Safety Council. He is also program chairman of the Purchasing Agents Association of Pittsburgh. He has been a contributor to engineering, safety and purchasing magazines, and has spoken on "Purchasing for Safety" before the National Safety Council and the American Society of Safety Engineers. Besides his responsibilities in directing the work of the buying staff, he does the purchasing of coal and coke, carbon electrode raw materials, lumber, furnaces, and some bulk chemicals and special mechanical equipment.

J. K. Miller, Buyer, is a graduate mechanical engineer from Cornell University. His six years in the Purchasing Department were preceded by ten years in engineering work for the company, in the Central Mechanical Engineering Division, the Pyrometric Division, and in transmission line field research. He purchases ferrous and non-ferrous metals.

T. O. English, Buyer, is a graduate electrical engineer from the Missouri School of Mines and Metallurgy. His first job was as a test engineer with the Westinghouse Electric & Mfg. Co. He joined the Aluminum Company organization in 1929 as technical apprentice with the Aluminum Ore Company at East St. Louis, and subsequently became electrical superintendent. In 1937 he was brought into the Purchasing Department, where he buys electrical equipment.

E. L. Iverson, Buyer, is a graduate mechanical engineer from Carnegie Institute of Technology. Starting in as a draftsman at the New Kensington plant eighteen years ago, he became remelting department and rolling mill departmental engineer and then assistant to the plant engineer. He came to the Purchasing Department in 1938 as buyer of structural and fabricated materials, rolling mill and other mechanical equipment.



Bauxite mining, underground and by the open pit method.

T. B. Parsons, Buyer, is a graduate civil engineer from Cornell University. He started with the company as an operating apprentice, later being assigned to the Sales Development Division. In 1937 he came into the Purchasing Department, where he buys construction materials, chemicals and laboratory equipment, stores supplies, refractories, automotive equipment and petroleum products.

L. A. Surdoval, Buyer, has been with the Purchasing Department twenty-one years, and prior to that was successively expediter, invoice checker and assistant buyer of office supplies in the Purchasing Department of the Pennsylvania Railroad — Lines West. He purchases paper and envelopes, tags, photographic materials, office supplies, drafting instruments and supplies and blueprint materials.

M. E. Burke, Buyer of printing, office machines and furniture, has been with the purchasing Department for twenty years.

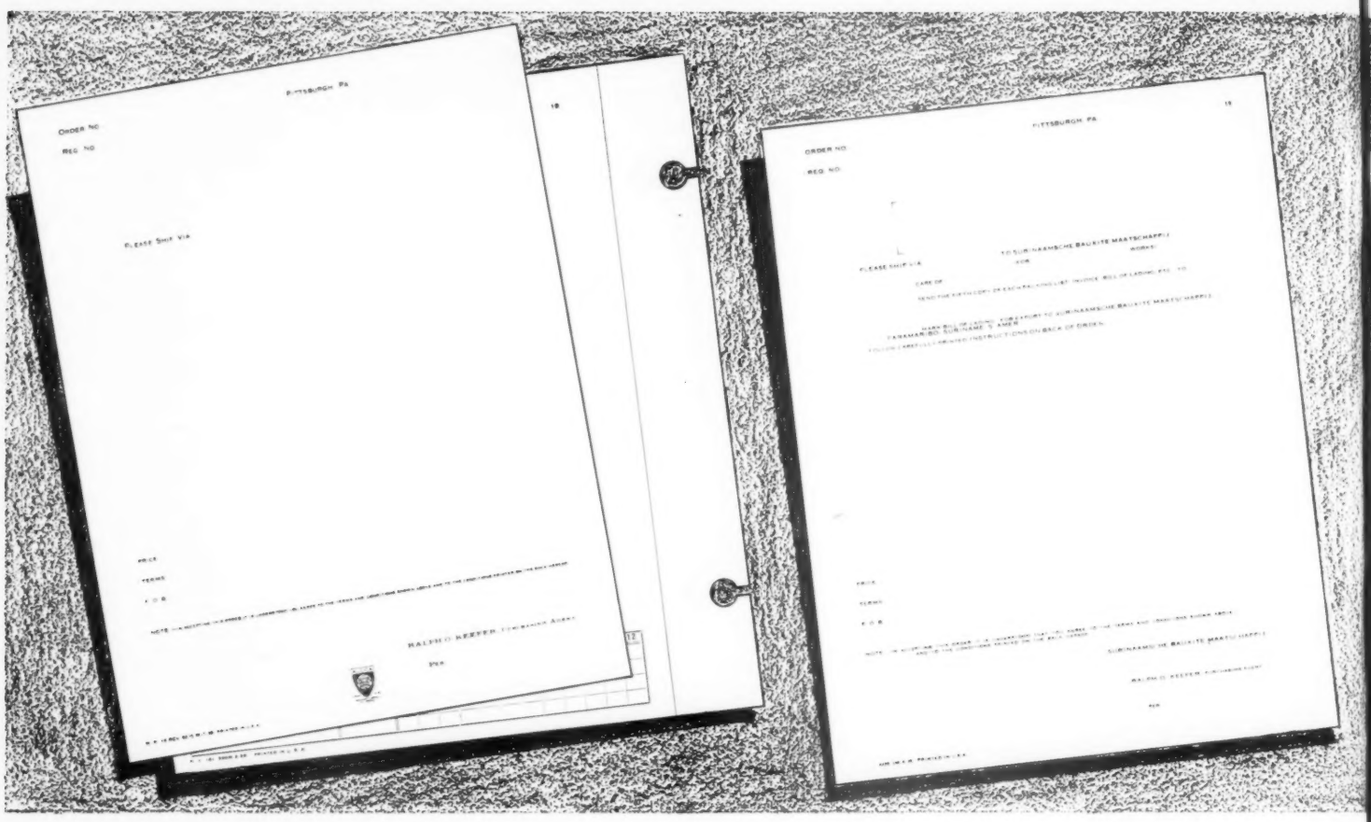
A. C. Reynolds, in charge of Purchasing Department Research and of the departmental library, is technically trained and came into the Central Construction Engineering Department from the American Bridge Company in 1912. His first assignment in the Purchasing Department was as buyer of construction materials, mechanical and electrical equipment. In recent years he has devoted the greater part of his time to purchasing-research of materials. As chairman of the company's Packaging Committee, he has done an outstanding job in the design, modernization and standardization of containers, and does the purchasing of containers.

Requests for bids are held to the practical minimum.

H. C. Slagle, Manager of the Surplus and Transfer Division, is a graduate mechanical engineer from Ohio State University, acquiring his technical education after several years of practical experience as machinist, diemaker, and foreman of the die shop of the Mullins Mfg. Co. He returned briefly to the Mullins Company after his college course, then joined the Aluminum Company organization in 1925 as production and time-study engineer at the Buffalo fabricating plant. In 1933 he was assigned to the Purchasing Department and undertook the standardization of stores materials and procedure, inaugurating the compilation of the standard stores catalog. In 1936, he became buyer of mechanical and electrical equipment. Since March, 1939, he has been in charge of the disposal of surplus equipment and is the buyer of heavy mechanical equipment, machine tools, and heavy construction equipment.

C. H. Ross, assistant to Mr. Slagle and now directly in charge of stores materials standardization, is a graduate of Pennsylvania State College, in industrial engineering. He started with the company at New Kensington in 1924 and served successively as machinist, draftsman, sheet mill production planner, maintenance engineer and production supervisor, subsequently getting into general plant engineering work with the Mechanical Engineering Department. He came into the Purchasing Department in 1939.

C. P. Kenney, Invoice Checker, has been in the department 21 years, serving as buyer of paper, containers, printing, engineering supplies and office equipment from 1918 to 1932, devoting his entire time since then, with three assistants, on the important and voluminous invoice work. Before coming with the Aluminum Company, he served as a buyer and invoice checker for the Pennsylvania Railroad.



The standard purchase order, and a special form used for the Suriname bauxite operation.

The secretarial and clerical staff brings the total personnel of the Central Purchasing Department at Pittsburgh up to 31 persons.

Also reporting to this central office are the twenty District Purchasing Agents at Alcoa, Tenn., Badin and Franklin, N. C., Bauxite, Ark., Cleveland, Ohio, Detroit, Mich., East St. Louis, Ill., Edgewater and Garwood, N. J., Fairfield, Conn., Lafayette, Ind., Los Angeles, Calif., Massena and Niagara Falls, N. Y., Mobile, Ala., New Kensington, Pa., New Orleans, La., and Vancouver, Wash. This group includes several who are widely known in association work, such as F. H. Missig, District Purchasing Agent at Detroit, who recently completed two years as N.A.P.A. Vice President for District No. 3, F. J. Meket, District Purchasing Agent at Cleveland, a past president of the Cleveland Association, and N. N. Gould, District Purchasing Agent at East St. Louis, a past Vice President of District 3. Including the personnel at these district purchasing offices, the buying operation for Aluminum Company of America employs a staff of well over 60 persons.

Layout and Reception

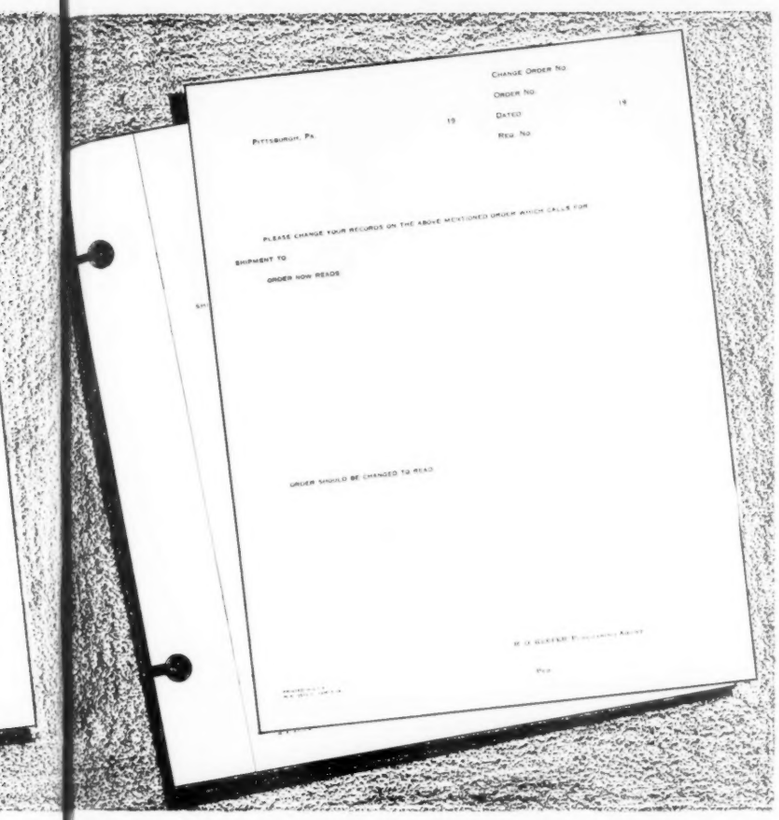
The Purchasing Department occupies a series of offices surrounding the reception room on the 17th floor of the Gulf Building in downtown Pittsburgh. The buyers' offices form a hollow square around the central corridor and reception room, with the offices of the Director of Purchases and the Purchasing Agent at one of the far corners of the square. The offices are joined by a series of inside doors, facilitating intra-departmental contacts and effectively consolidating the working quarters of the buying staff. Each buyer has a separate office where salesmen can be interviewed in absolute privacy.

The reception room, entered directly from the elevators, is ample, attractive and comfortable. More than forty salesmen per day come into this room, where they are courteously received by a receptionist who immediately reports their presence to the particular buyer they wish to see, and who makes it her business to avoid any undue delays in getting their interview. A daily record of visitors is maintained, showing the caller's name and company, the buyer seen, time of arrival, time of the interview, waiting time, and length of interview. An analysis of this record shows that waiting time is usually held below fifteen minutes, and that all callers are interviewed, whether for five minutes or for an hour and a half, depending on the nature of the business under discussion.

Procedure

The requisition is regarded as a matter coming primarily within the scope of the works management rather than of the Purchasing Department, for whom it constitutes the authority to buy. Consequently, according to the preference of individual works, it may be issued to the District Purchasing Department directly by the department requiring the material, or it may be made up by the storekeeper from a "Request for Material" received from the department. In either case, the requisition requires approvals by the appropriate department heads and superintendent before the district purchasing officer acts upon it.

When the District Purchasing Agent receives the requisition, he first checks it for the proper



Changes in purchase orders as bound so as to face the original copy in the file.

authorizations and for completeness of the information included. Clear catalog references, or references to former orders on which satisfactory material was furnished, are encouraged. However, the Purchasing Department is not limited or bound by such references.

He next checks it against stocks on hand in the stores and reclamation departments of the local works, and against the local surplus list. In the event that the requirement can be taken care of from any of these sources, arrangements for transfer and delivery are made locally. There is also a combined surplus list of all works, maintained by the Surplus and Transfer Division of the Purchasing Department at Pittsburgh, a copy of which is held in each purchasing office. If the requirement can be filled from this source, the fact is noted on the requisition and it is forwarded to Pittsburgh, where a transfer is effected by the Surplus and Transfer Division, by issuing a regular purchase order upon the plant where the material is available. Incidentally, all requisitions coming to the Pittsburgh office pass through this division before being distributed to the buyers, thus giving an additional check for the possibility of substituting surplus stock or using material which has accumulated since the latest master list was issued.

If the material is a standard item, used by two or more plants, it may be covered by a blanket contract executed at the Pittsburgh office. In that case, the District Purchasing Agent issues his local purchase order direct upon the supplier in accordance with the terms of that contract.

After checking against the contract files and the record of previous purchases to secure all information which may serve as an aid to prompt and proper handling of the transaction, the District Purchasing Agent signs the requisition and determines whether it is to be mailed to the Pittsburgh Purchasing Department, covered by a local purchase order, or submitted for quotations on standard inquiry blanks or by letter, etc.

Thus the requisition comes to the buyer who is to make the purchase. It is his responsibility to approve the quantity, form and propriety of the requisition, and to decide with what seller the order is to be placed. The request for quotations is held to a practical minimum consistent with a reasonable exploration of the market. As a rule, inquiries are sent to not less than three nor more than five possible suppliers.

There are two standard inquiry forms. One is used for obtaining quotations on materials to be purchased by local order. The other is used for obtaining quotations on materials to be purchased by the General Purchasing Department. The latter forms can be issued by district offices when the requisition is sent to Pittsburgh, as a means of saving time. These forms are used in all cases except when special details require a letter of explanation. Two copies are sent to each seller, one for his own record, and one to be filled in and returned with the quotation. It is interesting to note that on the back of the inquiry forms is printed the same list of "conditions" appearing on the back of the order form. Thus the bidder is automatically forewarned as to these "conditions" at the time he quotes. Also, since the bidder returns the inquiry form, on which he has

New floor decking of aluminum eliminated 750 tons of dead weight and prolonged the life of this Pittsburgh bridge by 25 years.

PURCHASING DEPARTMENT

General Sales Corporation,
1914 Fifth Ave.,
Pittsburgh, Pa.

Date Sept 10, 1934

We are trying to conserve your time as well as ours by using this form. It is sent you in duplicate to enable you to use one copy for a REPLY and keep the other for your files.

Gentlemen:—

This is an IMPORTANT REQUEST for INFORMATION concerning SHIPMENTS against our Order No. 648930 Dated Aug. 30, 1934 Please answer items checked

SHIPMENTS	Ck.	REPLY
1. When will you ship?		
2. In what quantity will you ship?		
3. Did you ship on date shown on order? How?	X	
4. Can you advance promised shipping date?		
5. Why did you not ship as promised?		
6. Make your delivery promise more specific		
7. Please start tracer on shipment made		
8. Reinque shipments as shown under remarks		
9. Give us forwarding reference so we can trace	X	Date shipped From Consignee Car initials and number Waybill reference Clerking Points Remarks
10. When will you ship balance of order?		
11. Advise present status of order and when you expect to complete		

REMARKS

Yours truly,
Aluminum Company of America,
Alcoa, Tennessee
H.H.Huddleston,
District Purchasing Agent

Follow-up is a responsibility of the District purchasing officer.

typed his quotation, this becomes an "offer to sell" *under these "conditions"* and an order based thereon becomes an "acceptance of an offer to sell," which automatically seals the contract.

Specifications and Standards

Basic raw materials are purchased upon definite specifications. In general, for other items, the "use specification" is preferred to a more definitive form to the end that potential sources are not limited or ruled out of consideration.

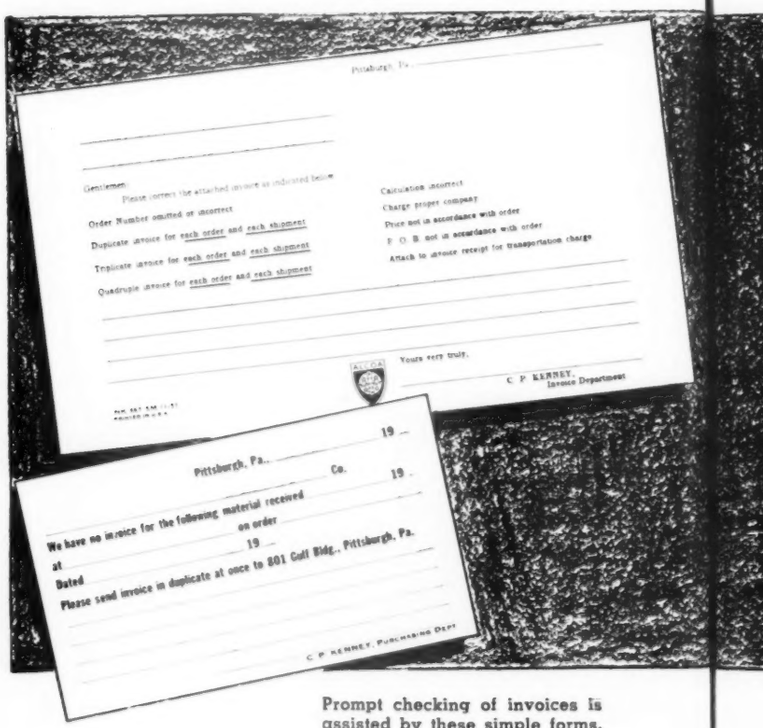
A metallurgist at the central office, reporting directly to the Director of Purchases, is in charge of tool steel standards, specifying the grades best adapted to the company's requirements in its various operations, and avoiding the expensive complexity incurred by the almost infinite variety of analyses and alloys now offered.

A most valuable project of the Purchasing Department has been the development of a standard catalog of stores items, listing on separate mimeographed sheets each one of the thousands of items in this category and bound for reference in the purchasing, stores, works, design and engineering offices. A typical sheet of this catalog carries a sketch of the item—bolt, packing, cable, etc., a concise summary of its properties and applications, and a table of sizes, with standard packages, ordering units, and weights.

These various specifications and standards simplify the problem of giving a clear and accurate description on requisitions, requests for quotations, and orders. When bids on identical specifications show a wide variation, the buyer raises the question of a possible ambiguity or misinterpretation of the specification. Under these circumstances, he will generally review the quotations with the high and low bidders to disclose any misconceptions which may exist; or, in the case of machinery and equipment, it may lead to a careful analysis of the bids to see whether the basis is truly comparable or if the apparently low bid will entail a variety of extras for parts and attachments. This procedure applies only to exceptional cases where an error is suspected. It is the well established policy of the department to operate on the basis of firm bids, each seller's quotation being considered as final. Copies of all bids are attached to the file copy of the purchase order, and become a part of the departmental records.

Purchase Orders

As stated above, the final authority and responsibility for purchases rests in the General Purchasing Department. Consequently all purchase orders, whether issued from this department or by a District Purchasing Agent, have the force of a Pittsburgh purchase order. This explains some rather unusual features of the order form. The Purchasing Agent's name and title are printed on the form as the authorizing signature. The name of the company or affiliate for which the order is issued, and to which the material is to be invoiced, is typed immediately above this line, so that one form serves for all purchases.



Pittsburgh, Pa.

Gentlemen:
Please correct the attached invoice as indicated below

Order Number omitted or incorrect
Duplicate invoice for each order and each shipment
Triplicate invoice for each order and each shipment
Quadruple invoice for each order and each shipment

Calculation incorrect
Charge proper company
Price not in accordance with order
F. O. B. not in accordance with order
Attach to invoice receipt for transportation charge

Yours very truly,
C. P. KENNEY,
Invoice Department

Pittsburgh, Pa., 19
Co. 19
We have no invoice for the following material received
at on order
Dated 19
Please send invoice in duplicate at once to 801 Gulf Bldg., Pittsburgh, Pa.
C. P. KENNEY, Purchasing Dept

Prompt checking of invoices is assisted by these simple forms.

The buyer or District Purchasing Agent signs immediately below, as the agent of the Purchasing Agent in this transaction. The complete set of governing conditions is printed not only on the original copy, but on the duplicate file copies to be held at the General Purchasing Office and at the works, so that from a legal standpoint the three reference copies will be identical in every respect. As a further legal detail, an acknowledgment is required on purchase orders, to complete the con-

tract, except when the purchase order is itself the acceptance of a definite proposal.

Orders written in Pittsburgh are numbered consecutively, while local orders carry as a prefix to the order number a letter symbol designating the works which is placing the order.

Pittsburgh orders are written with five copies: (1) the original, sent to the vendor; (2) duplicate, sent to the works (this is master hectograph copy so that the works can make as many hectograph copies as they need for their own use); (3) binder file copy, filed numerically in the Purchasing Department's records; (4) plain sheet attached to the requisition and pertinent correspondence, and filed by seller's name; (5) plain sheet, routed to the Traffic Department if it contains carload clause and to the Auditing Department if covered by authorization—in case it covers both, an extra copy is made.

Orders issued from district purchasing offices follow essentially the same system. The original goes to the vendor; one binder file copy and one plain paper copy are sent to Pittsburgh; one binder file copy is retained at the works, with any other copies necessary to the works' records.

So far as the vendor is concerned, any changes in the purchase order originate in the purchasing department responsible for the order, and there is

The purchase record and contract file are conveniently kept on card forms.

a special form for this purpose. Any department desiring a change made in an order sends its request to the Purchasing Department. The request for change, along with a copy of the change of order, are attached to the file copy of the purchase order in the sellers' file. There is also a binder file copy of the change of order. The binder strip on this form is at the left, whereas it is on the right of the purchase order copy, so that both will be visible when the order book is opened.

In addition to the standard order form, there is a special form for export orders to the bauxite plant in Suriname, South America, carrying special instructions applicable to such shipments.

Follow-up and tracing of orders is a function of the District Purchasing Agents.

Invoices are required in duplicate, and are checked in the Purchasing Department for quantity, prices, terms and F.O.B. point. If these details are correct, the invoice is approved for payment, contingent upon the works' approval of quality and quantity received, and it is passed along to the accounting department. The latter holds the duplicate copy, mailing the original to the works for notation of satisfactory receipt of material. Upon the return of this copy, properly checked, the invoice is vouchered and paid.

In checking the invoices, the Purchasing Department notes any cash discounts which can be earned, and indicates the available discount and the time allowed for payment. In the event that such invoices become payable before the acknowledgment of delivery is received from the works, the Purchasing Department's certification of the invoice, backed by a policy of dealing only with reliable suppliers, is taken as authority for payment on the duplicate invoice, through the regular channels, except that this copy is held in an "Incomplete Vouchers" file until the original is returned from the works, when it is placed in the regular voucher files.

Records

Records are regarded as working tools in the Purchasing Department of the Aluminum Company, and are kept as simple as possible consistent with an adequate presentation of essential information in usable form. The test of a proposed record is its historical importance, the useful purpose to be served, and whether that use would justify its cost. There are four principal records, as follows:

Material Specifications. As standards or specifications for purchased materials are adopted, they are filed and indexed for ready reference, and each buyer keeps this record at hand for use in the preparation of orders.

Purchase Record. A 5 x 8 card file carries a complete record of orders placed, the information being posted from a copy of the purchase order. Individual cards are maintained for each commodity, and frequently for each size or number within a material listing. They are filed alphabetically, according to materials, which are shown in the heading of the card. The record permits quick and accurate comparison between different purchases of the same commodity, and orders can be placed with a full knowledge of previous experience.

Contract Records. All contract commitments in force are necessarily a matter of record. The complete master file is kept at the Pittsburgh office, and duplicates are furnished to District Purchasing Agents who may have occasion to issue local orders against such contracts. Also, each buyer in Pittsburgh keeps in his own office copies of the current contracts with which he is concerned. As a working record, a 4 x 6 card file is designed as a desk reference, showing the essential details in nine lines: Material, Contract With,

Contract or Order Number and Date, Expires, Works, Quantity, Price, Terms, and F.O.B. The Central file is indexed in two ways: (1) By name of supplier, and (2) by name of commodity. The contract file is a permanent record at Pittsburgh, but district purchasing officers are permitted to destroy old contracts when they are replaced with a new agreement.

Order Files. As indicated in the above outline of procedure, order copies are filed in two ways: (1) a numerical file in which the duplicate copies are held, together with any changes, and bearing a record of receipts, all collated in lock binders, a thousand orders to the volume; and (2) a plain paper copy filed under the seller's name, with copy of the requisition, quotations, acknowledgment, and all important correspondence relating to the transaction. The same procedure is observed at

Specimen pages from the catalog of standard stores materials.

the Pittsburgh office and in the district purchasing offices. Both files are retained at Pittsburgh for a period of three years, then transferred to the storage vaults at New Kensington for ten years, after which they are destroyed. If it is desirable to keep a permanent record of specifications or the circumstances of a particular order, it is transformed to the contract file and indexed so that it may be readily located for reference.

Purchasing Manual

Mention has been made of the manual on "Standard Procedure for Purchasing," a development deserving of more detailed description, as it has been a most useful means of insuring the orderly conduct of purchasing operations throughout the far-flung organization.

Originally compiled by Mr. Jolly and issued in December, 1934, it brings together in a single volume a complete detailed set of instructions for every step of the purchasing process, with actual specimens of the forms to be used, the wording of special clauses to cover particular circumstances, and specific shipping instructions to every point of the company's operations, whether by express, parcel post, or freight, carload or l.c.l. It goes beyond this by incorporating a statement of policy and an explanation of the reasons underlying policies and procedures, so that it serves to build up a unified organization rather than simply laying down certain arbitrary instructions. It is not merely a guide to the buying staff; it likewise clarifies interdepartmental relations with its explanation of the purchasing process and the reasons for the various requirements.

The scope of the manual is indicated by the chapter headings:

1. Purchasing Policy
2. Organization
3. Legal Aspects of Purchasing
4. Relations with Other Departments
5. Relations with Salesmen
6. Buying Proper Quality
7. Buying Proper Quantity
8. Buying at Proper Price
9. Trial Orders and Samples
10. Repair Work and Free Service
11. Rental of Company Equipment to Other Concerns
12. Foreign Orders
13. Contracts
14. Surplus and Obsolete Material
15. Purchasing Department Requisition
16. Request for Quotation
17. The Purchase Order
18. Emergency Pick-Up and Petty Cash Orders
19. Follow-Up and Tracing Orders
20. Shortage or Defective Reports
21. Invoices
22. Purchasing Department Records
23. Special Instructions
    - (a) Automotive Equipment
    - (b) Cleaners for Aluminum
    - (c) Copper
    - (d) Office Supplies and Equipment

The manual is prepared in loose-leaf form, with a page numbering scheme which lists the chapter number first, and the page numbers for each chapter appearing as a secondary numeral, all arranged in a neat and sturdy paper covered post-binder. Thus additional pages, or corrected pages, can be issued as required, or minor corrections can be issued in mimeographed form, with instructions to make the change on the appropriate page of the manual. A complete revision of the manual, incorporating the changes which have occurred in the five years since its original publication and including some new material, is now in process by Mr. Keefer.

The manual is furnished to all department heads throughout the company. Each copy is numbered, and is recorded in the Purchasing Department with the name of the holder, so that the location of each copy is known, and all users may be apprised of changes when memoranda and new sheets are issued. It is expected that each copy will be kept up to date by this means, and copies are called back to the Purchasing Department when they are no longer needed by the person holding them.

While the original preparation of this volume was a stupendous mechanical task, it has proved its value in many ways, and provides an excellent summary of a highly effective purchasing operation.

"Resolved: I will not be high-pressured into buying goods I do not need. I will not be high-pressured into buying goods I do not need. I will not be high-pressured into buying goods I do not need."

SILHOUETTE STUDIES

IRVIN E. WALTON—Purchasing Agent of the Heppenstall Company, Pittsburgh.

A native of Philadelphia, he moved in early childhood to Atlantic City, N. J., the scene of his grade and high school education, and of his first business venture, a summer restaurant. That experience terminated disastrously when his partner defaulted at the end of the season with the funds of the enterprise. With characteristic integrity, Ike carried on long enough to pay off the current debts, forfeiting a couple of months of school to acquire this very practical education, which has given him an abiding distrust of partnerships though without impairing his genuine interest and faith in human nature.

I. E. WALTON

He worked his way through Pennsylvania State College, earning his degree in five and a half years, with time out to recoup his finances by working one winter in a New Jersey silk dyeing mill and a summer and fall as construction foreman with the Pennsylvania State Highway Department.

Upon his graduation from college, he entered the employ of the Heppenstall Company, and has been with that organization ever since, except for his service with the Marine Corps during the World War. Assigned to the aviation section, he was in training for flying when the Armistice came.

At Heppenstall, he started as a laborer in a press forging gang, but soon advanced to the heat treat department, inspector of aeroplane forgings, assistant foreman, sales work, production, district office sales, and assistant sales manager, prior to his appointment in purchasing a little more than ten years ago.

He became a member of the Pittsburgh Association shortly after getting into purchasing work. His talent for leadership and his infectious enthusiasm were soon recognized and put to work as he was drafted for office, serving as president, national director, and as general chairman of the N.A.P.A. convention at Pittsburgh in 1937. At present he is a director of the association, and chairman of the N.A.P.A. Committee on Legal Information. He is also a member of the Traffic Club of Pittsburgh, the Chamber of Commerce, and the Shrine.

He enjoys all sports, as a competitor and spectator. Skates, bowls, plays a good game of bridge, and does some amateur gardening around the house. His favorite pastime, however, is golf, which he plays seriously but not seriously enough to interfere with real pleasure. Most of all he enjoys people.

He is firmly convinced that the best and most effective business relationships are reached through a personal and friendly contact with individuals in the organizations with whom one does business. Declares that there is no greater assurance of cooperation, fair dealing and mutual assistance than a genuine friendly acquaintance as an adjunct to business relations. His wide circle of friends among suppliers and among his associates in purchasing bear witness to the fact that he comes more than half way in carrying out this principle.

———

CURTIS D. HART—Thirty-three years with the Taylor Instrument Companies, of Rochester, N. Y.; thirty years in purchasing. Liked and respected by salesmen because he's a square shooter, naturally friendly, knows his stuff, and retains a vivid recollection of his own three years on the road, carrying an 80-pound sample case over a territory that took five months to cover.

A native of Rochester, he was educated at the Rochester Free Academy, East High School, and the University of Rochester, where he excelled as a pitcher and first baseman, besides playing some football. Member of Alpha Delta Phi fraternity. Summering on Lake Ontario since early childhood, Curt is an expert swimmer and sailor, these being his favorite pastimes for many years. He enjoys all sports, indoor and outdoor.

Happily married 26 years ago, he has four children, the youngest now 14 years old.

He learned his purchasing under the tutelage of Henry Kimmel, his predecessor in office. Active in the work of the Rochester Association since its organization in 1915, he has run the gamut of all the offices, from mere member to president and national director, and his interest has never flagged. He is currently serving as editor of the *Genesee Valley Buyer* and chairman of the annual Industrial Products Exhibit. He was instrumental in establishing centralized purchasing for the City of Rochester when the manager type of municipal government went into effect, and was chairman of the committee which drew up and secured the adoption of the code of qualifications for the office of City Purchasing Agent.

WILLIAM B. CUMMINGS—Purchasing Agent for the New England Confectionery Company, Cambridge, Mass., where he heads the department which he helped to establish and organize more than twenty years ago.

Born in the shadow of historic Dorchester Heights, of an old Boston family, Bill was headed for Massachusetts Institute of Technology and a career in engineering. He graduated from Mechanic Arts High School and the South Boston Art School in preparation for that course. At this point, however, he reached the boyish decision that he knew enough to battle life. As a youngster he had always been more than ordinarily successful in landing vacation jobs, and had acquired rather a wide business experience. His confidence was further borne out by the fact that even before his graduation from high school he secured a position as draftsman with the Fore River Shipbuilding Company.

For several years he continued his work as draftsman, the position at Fore River being followed by similar work with the Coffin Valve Company and in architects' offices. His greatest disappointment during this period came after he had qualified for the comprehensive training course at the Cadillac Motor Company, a plan that was discontinued as young Cummings was literally on his way to buy a ticket to Detroit.

He came to the New England Confectionery Company as a draftsman in 1911, and shortly afterwards had an opportunity to transfer to the commercial department, in cost work for plant maintenance. His first buying was in connection with maintenance supplies and equipment, gradually extending the scope of this work as the company expanded and a policy of centralized purchasing replaced the looser methods that had previously prevailed. He took naturally to the purchasing work and was on his way toward larger responsibilities in that phase of the business when the World War interrupted his business career. The centralized organization was completed when Bill returned to the company after his wartime service in production planning at the Watertown Arsenal. When the department was definitely established, he was placed in charge.

W. B. CUMMINGS

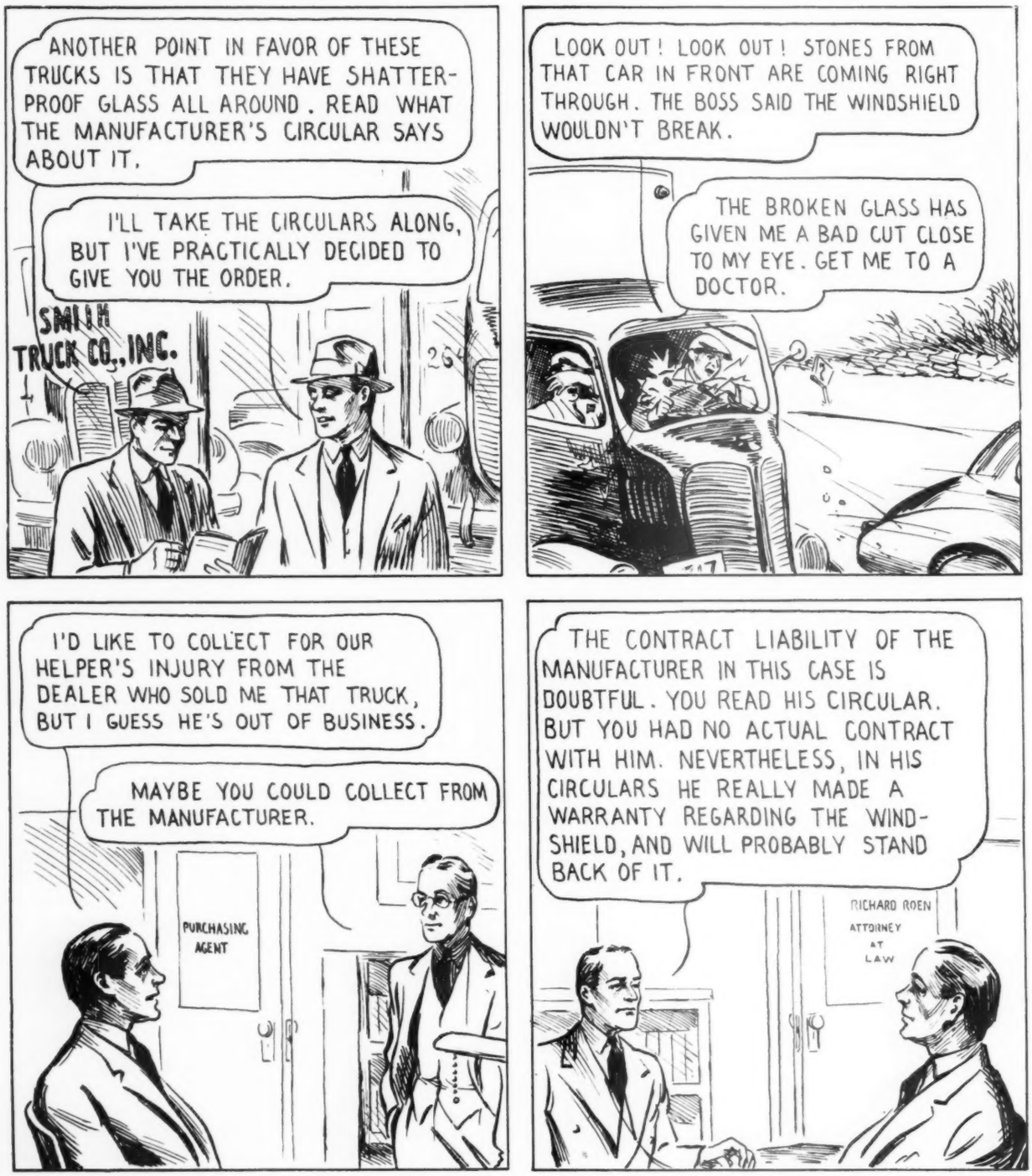
He joined the New England Association in 1919, and was elected to the Board of Directors in 1923-1925. Though consistently interested and active in association work, and serving effectively on innumerable committee assignments, there was a lapse of ten years before he was again induced to take office. He returned to the Board of Directors in 1936, and is currently serving as president of the association.

In 1917 he married Miss Grace Robinson, and has two sons, twenty-one and eighteen years of age. He thoroughly enjoys his home and family. He has given much time and effort to Boy Scout work as chairman of the local Scout Committee and member of the Executive Council. Recently he served on a civic committee for his home town of Arlington, Mass., drafting a revision of the by-laws for better control of municipal purchases.

He is fond of outdoor sports—canoeing, motorboating, hunting, fishing and golf are among his favorite avocations. Not claiming any particular superiority or skill in these sports, he is nevertheless in constant demand as a partner—a tribute to his good companionship, a characteristic which is essentially a part of his nature. He also dabbles at ping-pong and bridge, and fills in on a barbershop quartet without much urging. He is a grand companion, modest, competent, and always ready to do his part whether for fun or in a serious undertaking.

C. D. HART

PEN-POINTS ON PURCHASE LAW


ANOTHER POINT IN FAVOR OF THESE TRUCKS IS THAT THEY HAVE SHATTER-PROOF GLASS ALL AROUND. READ WHAT THE MANUFACTURER'S CIRCULAR SAYS ABOUT IT.
I'LL TAKE THE CIRCULARS ALONG, BUT I'VE PRACTICALLY DECIDED TO GIVE YOU THE ORDER.
SMITH TRUCK CO., INC.
LOOK OUT! LOOK OUT! STONES FROM THAT CAR IN FRONT ARE COMING RIGHT THROUGH. THE BOSS SAID THE WINDSHIELD WOULDN'T BREAK.
THE BROKEN GLASS HAS GIVEN ME A BAD CUT CLOSE TO MY EYE. GET ME TO A DOCTOR.
I'D LIKE TO COLLECT FOR OUR HELPER'S INJURY FROM THE DEALER WHO SOLD ME THAT TRUCK, BUT I GUESS HE'S OUT OF BUSINESS.
MAYBE YOU COULD COLLECT FROM THE MANUFACTURER.
PURCHASING AGENT
THE CONTRACT LIABILITY OF THE MANUFACTURER IN THIS CASE IS DOUBTFUL. YOU READ HIS CIRCULAR. BUT YOU HAD NO ACTUAL CONTRACT WITH HIM. NEVERTHELESS, IN HIS CIRCULARS HE REALLY MADE A WARRANTY REGARDING THE WIND-SHIELD, AND WILL PROBABLY STAND BACK OF IT.
RICHARD ROEN ATTORNEY AT LAW

THE purchasing agent is here seeking someone on whom to impose the liability for the defective windshield. The immediate vendor is out of business, probably with assets liquidated. There remains only the manufacturer. But the purchasing agent had no actual contract with the manufacturer. He had dealt only with the dealer, an independent businessman. Is the purchasing agent, nevertheless, permitted by law to recover from the manufacturer for breach of a contractual warranty regarding the glass described as shatterproof in the manufacturer's circulars?

A few recent cases do allow such recovery, particularly for injuries arising through the use of unwholesome food. In the majority of instances, recovery is not allowed, unless negligence on the part of the manufacturer is shown or taken for granted from the nature of the case.

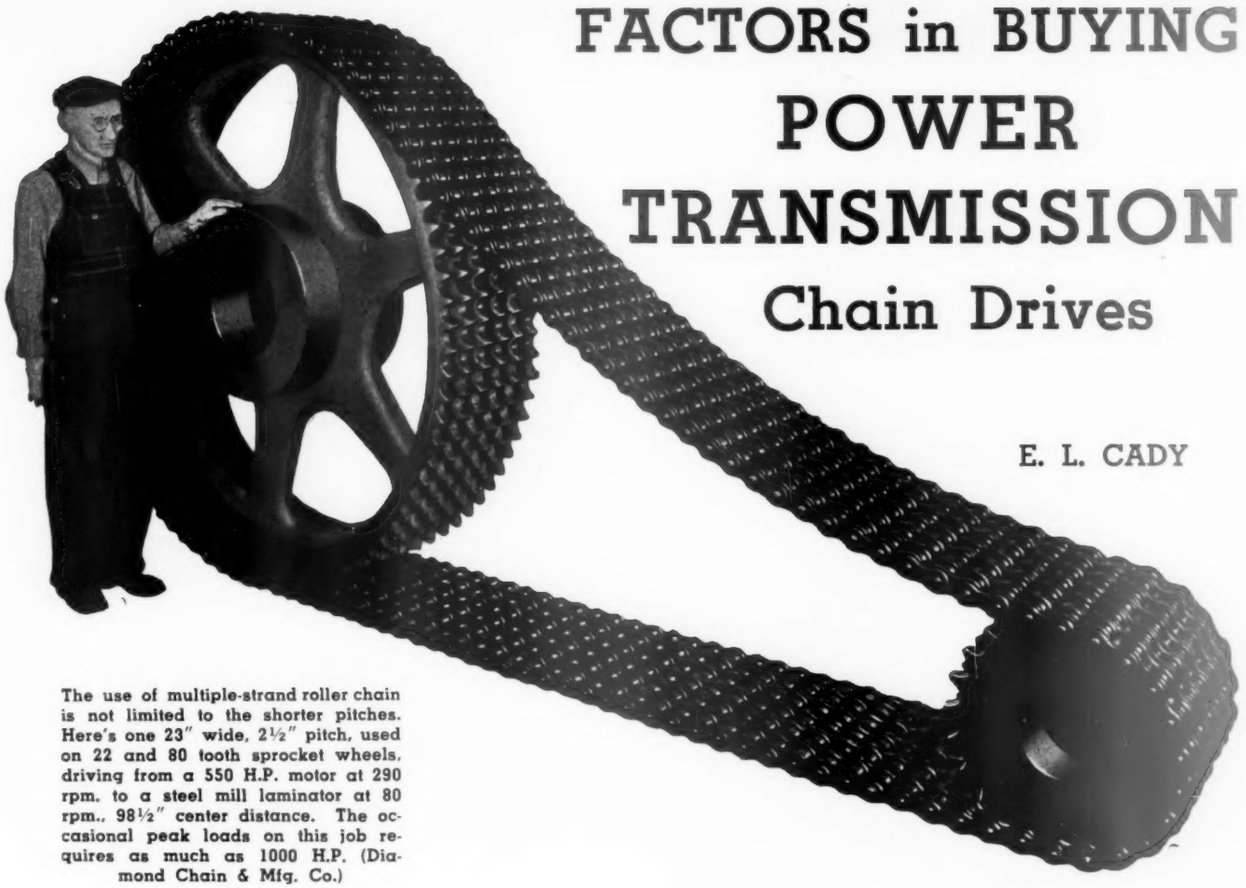
Lawyer Roen, however, seems to be right in saying that, as a matter of business policy, a manufacturer would recognize such a bona fide claim as the purchasing agent is sponsoring. Those claims that looked spurious it would combat on the grounds discussed.

Copy by H. H. Shively, Babson Institute; drawings by G. E. Tulloch.

FACTORS in BUYING POWER TRANSMISSION

Chain Drives

E. L. CADY



The use of multiple-strand roller chain is not limited to the shorter pitches. Here's one 23" wide, 2½" pitch, used on 22 and 80 tooth sprocket wheels, driving from a 550 H.P. motor at 290 rpm. to a steel mill laminator at 80 rpm., 98½" center distance. The occasional peak loads on this job requires as much as 1000 H.P. (Diamond Chain & Mfg. Co.)

POWER transmission chain drives include the chains, the sprockets, the take-ups or aligners, possible accessory links or devices, guards, lubricators, and the like.

These drives are bought for three general purposes. These are, in order of the numbers of purchases made:

1. For maintenance. To replace chain drives, or to displace other kinds of drives.
2. For new equipment. To drive new machines or groups. Or as parts of machines or devices built or revamped for use within the buyers' plants.
3. As original equipment. To be installed and shipped out on products made by the buyer.

Chains also may be bought for automobile truck repairs, and for the timing of internal combustion engines, Diesel equipment, etc. But here we deal only with their use for production equipment.

Because of the growing need for positive driving and controlling of machines, the employment of chain drives is increasing. Therefore, PURCHASING asked transmission chain drive manufacturers what factors should be considered in buying them.

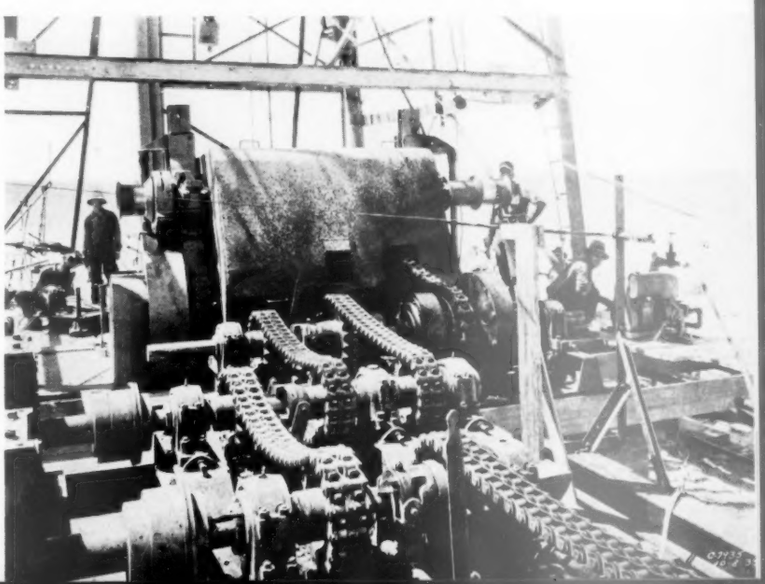
We asked them, in effect: "What is the best way to get the lowest ultimate costs in chain drives?"

This article is a digest of their answers.

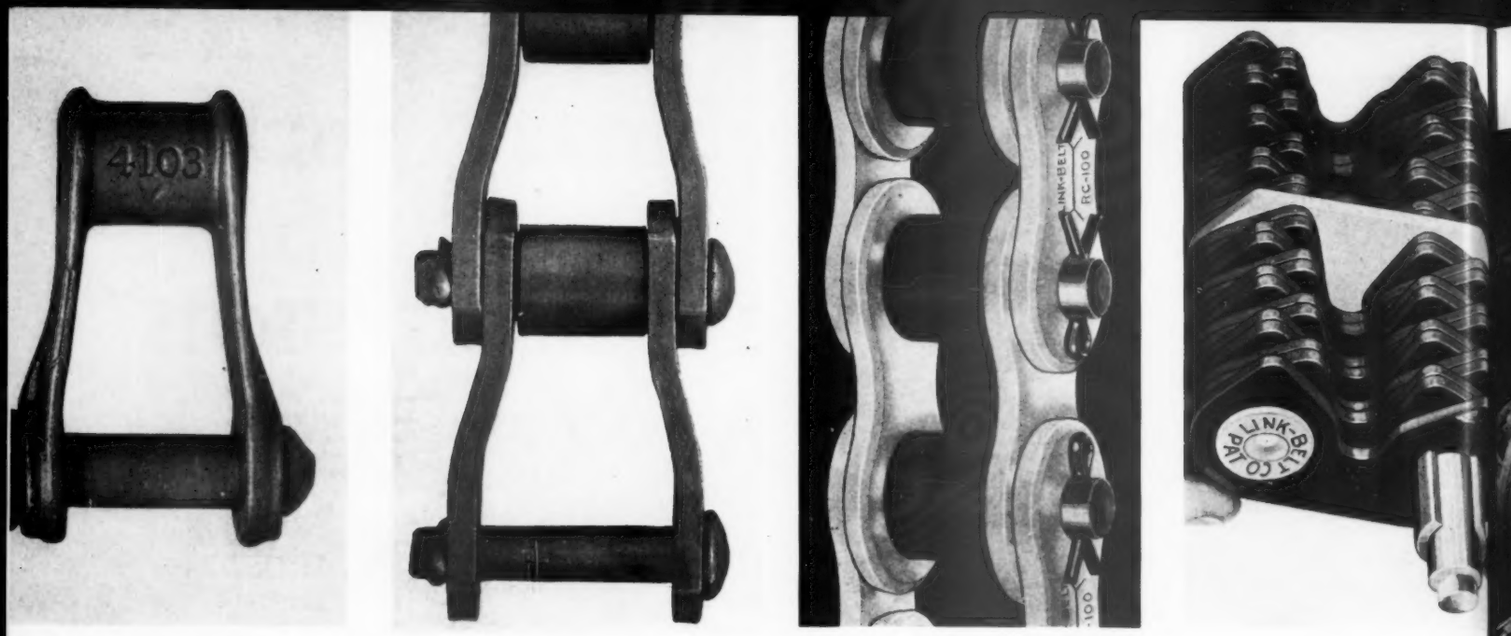
Service Considerations

The point on which all manufacturers were in strongest agreement, was the importance of the engineering service given by chain manufacturers and their representatives, particularly in respect to original equipment installations. Factors which seem to be subtle, can make the differences between satisfactory performance and very long performance. And with specialized engineering, new values and cost-savers can be added to the functions of many drives.

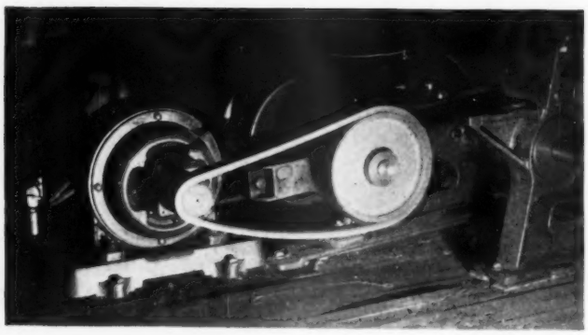
The local distributors of the chain drives may be the contacts for most maintenance and new plant equipment installations. Their crews may install the drives. Therefore, chain manufacturers say, the service of the mill supply house handling a chain may be a pertinent engineering



Tough drilling in the oil fields requires rugged and dependable power transmission. (Chain Belt Co.)



Four general classes of drive chains (left to right): Malleable iron or steel chains without bushings or rollers, working on cast sprockets; steel roller chains with bushings, working on cast or cut sprockets; finished roller chains working on cut sprockets; silent chains working on cut sprockets. (Link Belt Co.)



The smoothness of chain drives is illustrated by this unretouched photograph of a 5/8" pitch chain operating at more than 2000 f.p.m (Ramsey Chain Co.)

factor in calculating the final costs of drives.

Engineering service may choose among types of chains, and among grades and features within types.

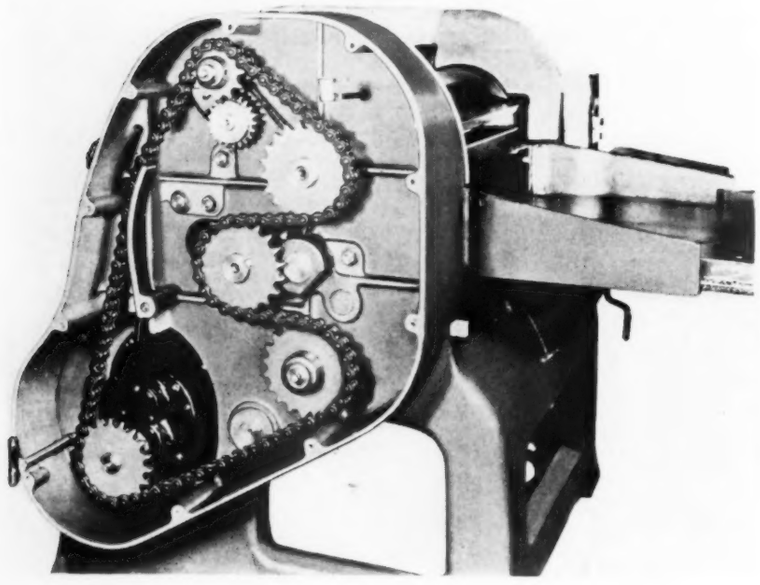
Types or classes of chains, in order of the operating speeds at which they are most commonly used, are:

1. No bushing or roller chains for use on cast sprockets.
2. Lower accuracy steel roller and bushing. For use on cast or cut sprockets.
3. Higher accuracy steel roller and bushing. For use on out sprockets only.
4. Silent types, for cut sprockets only.

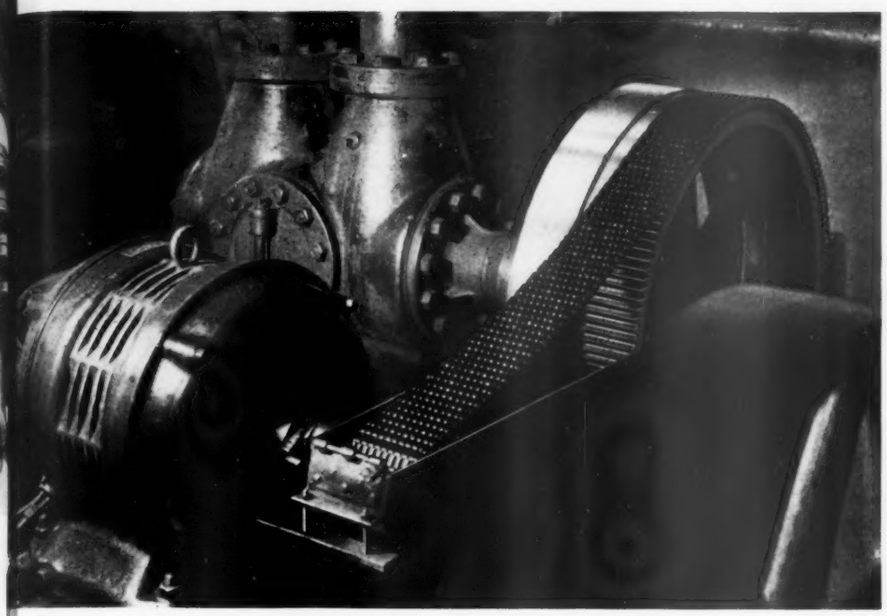
Within each of those classes, there are chains made of special alloys, of special accuracies, or having other special features. The desirability of avoiding these, and of using standard types which can be had from several sources of supply, may be enhanced if war time conditions get worse. Choosing the best standard or special chain for any given installation, must be by several factors about which suppliers can advise.

Quality Factors

Ultimate tensile strength of the chain is one factor. It is important in that it must be high enough. But it usually is measured by steady pulling on the chain to be tested, and therefore does not tell the full story of strength. The tensile strength of chain does not in any way offer a measure of power transmission capabilities, these be-



Roller chains alike on both sides may be run over or under the sprockets, a distinct advantage in many machinery applications. (Diamond Chain & Mfg. Co.)



Chain drive on a Pratt & Whitney compressor (Whitney Chain & Mfg. Co.)

Special Operating Conditions

Hygroscopic

Moist

Wet

Hot

Cold

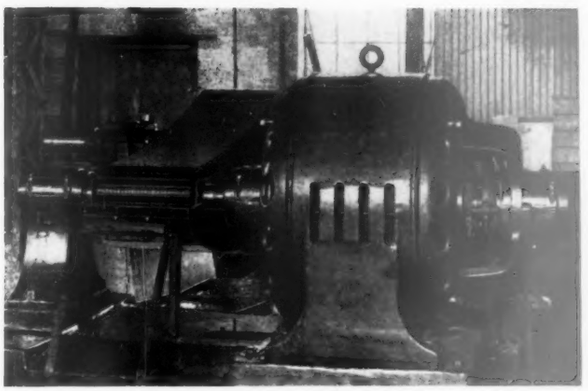
Corrosive

Abrasive

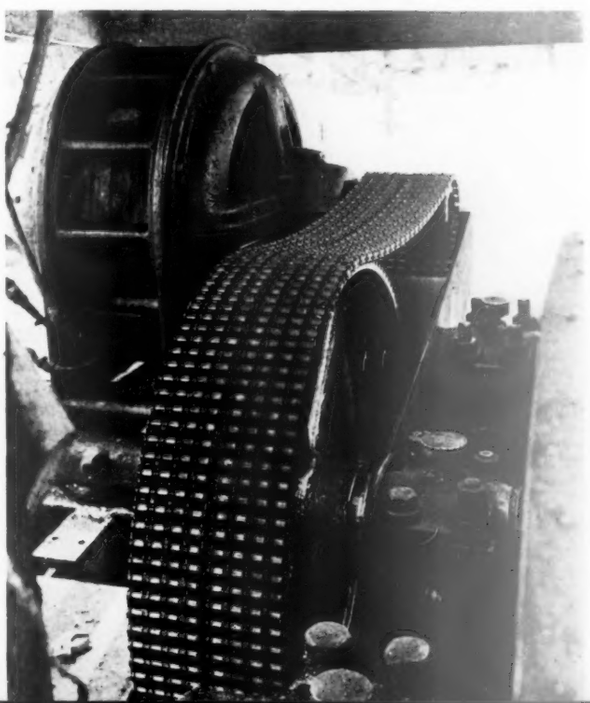
Gummy

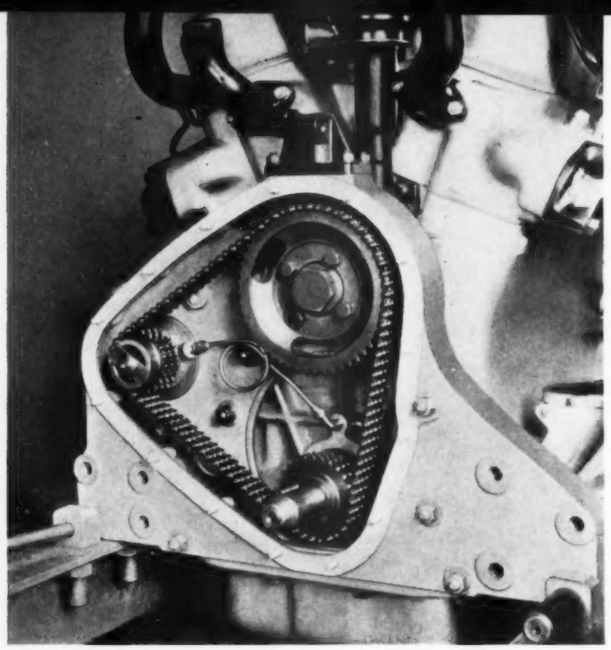
Some Factors In Buying Chain Drives

1. Engineering Service
2. Local Availability
3. Service Hazards
   - Shock
   - Misalignment
   - Fire
   - Moisture
   - Chemical
   - Lubrication difficulties
   - Non get-at-ability
   - Space available
   - Loads and speeds
   - Safety
4. Real Installation Costs
   - Chain
   - Sprockets
   - Adjustments
   - Guards
   - Lubricators
   - Labor
   - Machine outage
5. Real Service Life
   - At peak efficiency
   - At acceptable efficiency
6. Preventive Maintenance Costs
   - Lubrication
   - Take up
   - Re-alignment
   - Shear pins
   - Labor
   - Equipment outage
   - Supervision
7. Salvage Values
   - For easier drives
   - Incidental use
   - Scrap
8. Repair or Restorative Maintenance Costs
   - Whole chains
   - Individual links
   - Sprockets
   - Other parts
   - Labor
   - Supervision
   - Equipment outage



Above: This chain drive has been on 24-hour service, 6 days per week, since 1927. (Ramsey Chain Co.) Below: Successful operation under gritty conditions in a sand and gravel plant. (Chain Belt Co.)





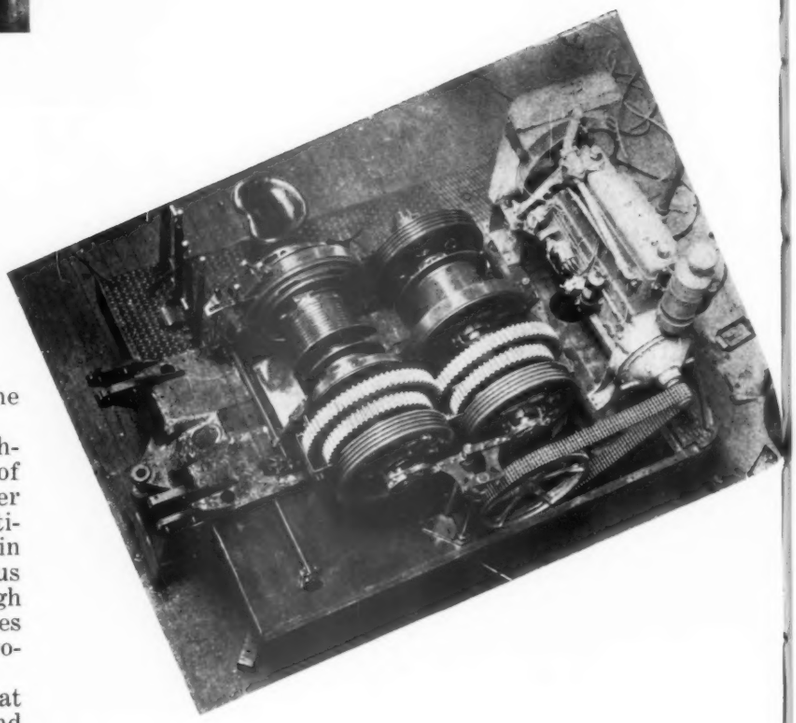
A high-speed timing drive. Triple 3/8" pitch roller chain operating at 4200 r.p.m. (Diamond Chain & Mfg. Co.)

●

At right: Assembly view, showing a quadruple chain drive installed from the power plant on a dragline excavator. (Diamond Chain & Mfg. Co.)

Why Chain Drives Are Used

Positive	Convenient local supplies
Flexible	Few operating troubles
Short centers	Wide selection of types and sizes
Little maintenance	Adaptable
Easy replacement	Low ultimate costs
Wise engineering service	



ing rather a matter of the quality and area of the pin-bushing joints.

Shock resistance, or ability of the chain to withstand sudden, hard yanks, is a measure of strength. Repeated shock loads, though well under the breaking strength of the chain, may ultimately cause fatigue breaks or stretch the chain out of its pitch without actually breaking, thus causing operating troubles. The use of tough alloys, suitable heat treatments, and accuracies of manufacture with good structural design, provide shock resistance.

Wear resistance is a matter of alloys, heat treatments, accuracies, structures, protection and lubrication. Some operating conditions call for low priced chains which can be replaced cheaply after rapid wear. But most drives are best served by installations which will last as long as the equipment they operate.

A factor of growing importance in wear resistance, is the secondary efficiency of the drive. This problem is common to all parts of modern machines. When brand new, the drive is at its peak efficiency. But after that there may follow a period of secondary efficiency during which the drive is too valuable and satisfactory to discard but is somewhat under its best efficiency.

The slight noise made by a chain may increase as it goes into its period of secondary efficiency. Noises, caused by vibration, may be air borne or structure borne. A partially worn drive may seem silent to a man standing close by it, yet may be sending through shafts, beams and other structural members, vibrations which are annoying to people some distance away.

The smoothness with which driven equipment operates, may decrease with the secondary efficiency of the chain. And with modern, finely finished products to be made, this smoothness may be a necessity.

Buyers therefore make choice between two courses. One is to select drives which will last through their secondary efficiencies as long as the operated equipment does. The other is to get drives which will maintain peak efficiencies for the longest periods, even if this entails higher initial costs.

Operating Conditions

In discussing such matters with the sales engineers of chain manufacturers or of local suppliers, it is important to tell these men enough.

They need to know the actual load factors to be carried, any special conditions under which the drive must function, and any desired improvements in performance as contrasted to the drives

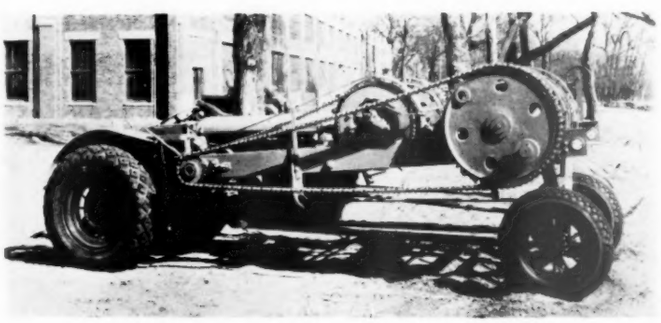
being replaced or displaced. And they need to know the worst.

The first point is the load factors. These are divided among starting, running, stopping and reversing. Important to them is speed, shock, fluctuation, and the time periods of operation. A drive which is running steadily all way, may withstand less abuse than one used intermittently for short running periods.

Load factors and special conditions to be met, may change during the life of a drive. Changing of products, to be made by the driven equipment, adding of control mechanisms, and changing of whole factory atmospheres, all are common and abrupt today. The drive which was adequate a year ago, may need serious re-study before being replaced when worn out.

Electrical circuits, overloaded by adding new equipment, may be putting fluctuating load strains on drives. Many automatic control devices must act by over controlling enough to overcome operating inertias, and so may put shock loads on drives. Air conditioning can add hazards of either moisture or hygroscopic dryness. A change in type of driving motor to make operation less fluctuating, can eliminate the shock cushioning slip on which the designers of the drvie counted. Changes in the materials to be processed, may add acid, abrasive, or high speed hazards.

The sales engineers cooperating on the replacement of an old drive or the installing of a new one, need to know not only what such changes have occurred, but what ones are planned or even are possible. When considering chains for new equipment or in redesigning or changed functioning of old equipment, the possible secondary functions of some kinds of chains may be useful. Equipped with lugs, special links, plates, etc.,



Oil field draw works, using double, triple and quadruple roller chain drives. (Diamond Chain & Mfg. Co.)

power transmission chains can convey materials, trip automatic mechanisms, eject finished materials or feed raw ones, carry tools to their points of operation, and the like. To all such possibilities, sales engineers need to look ahead.

Installation and Maintenance

The sales engineers also need to know whether or not chain drives can be located, or re-located, to leave more room for machine operators or for other mechanisms .

The abilities of these drives to function in very little space and in out of the way spots, is their greatest maintenance hazard. All too often they are hard to get at for inspection and lubrication.

Drives must be aligned properly, and must be kept in line. The higher the speed and heavier the load, the more important this is. Also, unless the drives are away underloaded or unless slack makes no difference, there should be provision for taking up initial stretch and slight wear, while keeping alignment accurate.

Continued on page 88

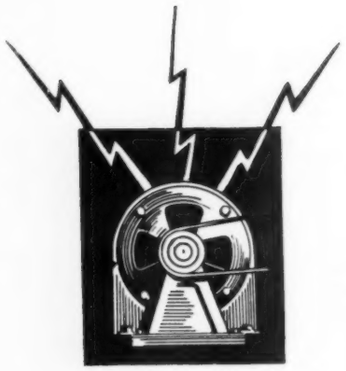
Schematic Check List of Load Factors

1. Starting Load
   - How often . . .
   - Is running load times what . . .
   - Yank . . .
   - Gentle . . .
   - Intermittent shocks . . .
   - Acceleration
     - Rapid . . .
     - Slow . . .
     - Variable . . .
2. Running Load
   - Steady . . .
   - Steady speed, with shocks . . .
   - Variable . . .
   - Variable, with shocks . . .
3. Reversing Load
   - How often . . .
   - Abrupt . . .
   - Smooth . . .
4. Stopping Load
   - How often . . .
   - Stops heavy machines . . .
   - Stops motor only, or light machines . . .
   - Deceleration
     - Abrupt . . .
     - Rapid . . .
     - Slow . . .
     - Idling . . .
5. Shock Protections
   - Shear pins . . .
   - Clutches . . .
   - Belts . . .
   - Governors . . .
   - Fly wheels . . .

Selecting Classes of Chains

1. Operating speeds
2. Ultimate tensile strength
3. Shock resistance
4. Wear resistance
5. Special conditions
6. Operating noises
   - Air Borne
   - Structure borne
7. Operating smoothness
8. Secondary functions
   - Convey
   - Trip mechanisms
   - Operate signals
   - Feed and eject
   - Index

ELECTRICAL POWER



Shall we purchase it or generate our own?

C. N. PARKES

ELECTRICAL power is the lifeblood of industry. From the standpoint of the purchasing agent the aggregate annual consumption is more than sixty billion kilowatt hours. The cash value of this item is $1,200,000,000, the equivalent of the cost of constructing twenty-four modern battleships.

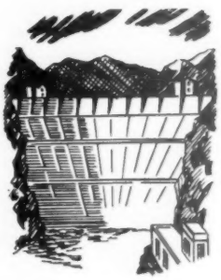
The purchase of an item representing a cash outlay of such proportions will naturally set the mind of the purchasing agent to analyzing costs. A previous article (in the issue of May, 1939) stressed the proper interpretation of rate schedules for the users of purchased power. This is written with the assumption that you are either purchasing at the most advantageous rate or else generating your own energy.

GET THE FACTS

THE causes prompting your investigation into the relative costs of purchasing power or generating your own, may be varied and widely divergent. Advocates for each theory will have much to say. You will be confronted with a conflicting mass of truths, half truths, and untruths. Words will be hurled at you through a smoke screen of statistics. Assertions will be flung by the diplomatic corps of the public utility company. More phrases will be tossed by the shock troops of the equipment manufacturers. In one large eastern city, the board of school directors became so confused by the conflicting arguments that a consulting engineer was retained to make an independent survey at a cost of $10,000. After the survey was completed, there is still no action taken because of the complexity of the problem.

Once it becomes known that a change or even an inquiry is contemplated, pandemonium breaks forth and the propagandists rush in from all sides. Pressure is applied from every angle to influence your decision.

Your own investigation will reveal several basic truths common to both. The cost of generation will depend on conditions within your factory, while the cost of purchased power depends largely on conditions of the available power supply.



LOCATION DETERMINES POWER SOURCE

LOCATION is a prime factor. Industry follows fuel in its search for strategic locations. That fact applies to coal, oil, or natural gas. Anthracite coal is produced only in Pennsylvania. Bituminous coal is mined in thirty states with Pennsylvania leading in production.

Because of the widespread publicity given to hydroelectric plants during the last few years, particularly by the government, it is common belief that water power is a cheaper medium for generation for the public utilities and government projects. In some instances there are savings; in many there are economic disadvantages. The development of a hydro plant and its attending site is not figured in pennies. The fixed charges of this type of industry are twice as great as those of some other forms of generation. Failure of water supply is not outside the realm of possibility.

The location of a hydroelectric station is frequently at a remote site, making the source of supply relatively distant from the point of consumption. A transmission line may exceed $20,000 per mile in cost when carried over high tension towers. The farther removed the consumer is from the point of generation, the greater the linedrop. In some instances the leakage reaches 20%. All this when other types of generation can be placed almost any-

where, using the cheapest and most accessible fuel. It is true that water is also required for other types of generation, but primarily as a medium of condensation only.

Natural gas is now produced in twenty-one states. Many non-producing states are supplied by pipelines. Three-fourths of the total production is consumed industrially.

Fuel oil is also used to a large extent by industrials located along the seaboard. These factories are located near wharves that accommodate the tankers. The gas and electrical power plants as a unit consume 30,000,000 barrels (42 gallons) annually.

It may be seen that location and fuel both play a very important part in the economical production of electric power. That is true of consumer generation and purchased power in as much as it has a direct effect on rates.

From this point on, there is very little common ground for relative comparison. It is impossible to follow a hard and fast formula to guide your decision. The best method is to sift pertinent and flexible suggestions until they localize your own problem. Bear in mind that the variance in cost of purchased power has an amazing range. From the standpoint of type of industry it may slide from three cents per kilowatt hour in leather-goods shops to three mills per kilowatt hour in the chemical manufacturing industry. From the standpoint of location the variance is just as great.

It may reasonably be stated, though not without exception, that in areas where purchased power is cheap because of location, the savings effected by consumer generation is either very small or nil. The exception lies in those industries where the importance of power cost is well above the average. To clarify the statement, before considering consumer generation in an area where "low cost purchased power" already exists, the power should be of such importance in cost that it is almost a basic raw material.

UTILIZING AVAILABLE CAPACITY

INDUSTRIES that use a large volume of steam in heating or processing often find it advantageous to generate their own power. Exhaust steam from high pressure boilers may be readily utilized by direct hookup with power units. Even a small plant that falls into this classification may profit. An engine generator set with the capacity of 100 kilowatts, by utilizing the exhaust steam, can generate one kilowatt hour by using one-half pound more coal. The usual central station requires two pounds to generate one kilowatt hour.

There are several angles at this point which will bring objections. You may represent an industrial that uses a large amount of steam. The power demand may exceed your own ability to generate enough power for peak loads. In this case the differential may be purchased and consumer generation still be advantageous. Some industrials may find themselves in the unique position of generating more than is required. Public utilities have often arranged to purchase overages of this type. One shipbuilding corporation on the eastern seaboard had enough capacity to carry an area of 50,000 population when the utility plants failed in a severe storm because of high water.

In industries where steam is used in large volume for heating purposes, it may be profitable to generate during the cold months and purchase power when no heat is needed.

For industries of all sizes when the steam load is great in comparison to the power requirements, consumer generation is usually desirable. If 50% of the exhaust steam is utilized to replace the steam flowing directly from the boilers, the fuel costs are practically halved in the power generation.

If your industry operates on a twenty-four hour a day basis, whether you use steam or not, consumer generation is often an asset. As the hours of operation increase, the overhead cost decreases. The return on the initial investment is two to three times as great. Bakeries, dairies, food manufactories, and many others that have a long operating day, profit by consumer generation.

If your industry already maintains a large size boiler plant, a power unit can be added readily without increasing the boiler capacity. This circumstance is often found in laundries, in dye houses, etc., that have converted the situation into added profits. An added feature is found in the fact that there is very little added to their labor overhead. The only real expenditure is in the power unit.

DIESEL ENGINES PROVIDE LOW-COST POWER

FOR the smaller industries, hundreds of thousands of horsepower hours are being converted into low cost electrical energy by Diesel engines. This type of generation is making tremendous strides in competition with purchased power.

The growth of the Diesel engine industry has been aided by depression years and lean markets. In plants of medium size this medium of generation can produce power, in many instances, for less than one cent per kilowatt hour. If you are paying more, an unbiased survey made by an engineer who is not prejudiced, might prove beneficial. You, at many times during a year, call in an electrical contractor for maintenance, repair, or alteration. That man has probably the mental and actual equipment to give you a bona-fide survey at little cost.

It is difficult to find any industry to which engineers have been unable to adapt Diesel power. These engines are used widely in the commercial, industrial, and transportation fields. The main requisite in making a selection, if you decide on an installation, is to choose a reliable unit backed by a company beyond reproach.

Continued on page 89

Background for Purchasing

THERE'S no such person as "the average purchasing agent." We found that out when, in recent weeks, we compiled the case histories of 244 representative purchasing men, covering their educational and business training and experience. But the composite picture which emerges from this study—as accurate a cross-section of the field, we believe, as can be determined—does reveal some interesting and significant facts regarding the background and qualifications of today's buyers, and furnishes authentic current information regarding the sort of men to whom industry has entrusted the wise expenditure of 58½ cents of the manufacturing dollar, the government's estimate of the average portion of industry's total budget which goes for materials and supplies.

Career Men in Purchasing

Two of the questions asked were: "How long have you been with your present company?" and "How long in purchasing work?" The answers to both of these inquiries indicate an unusual continuity of service and relatively low rate of turnover. Purchasing has a definite status as a career occupation, and is a worthy objective as an executive position in the management organization. Furthermore the answers reveal a high average length of experience in purchasing work, indicative of the competence and knowledge which come from such experience.

The length of service among these 244 men in their present companies ranges from five instances of two years or less, up to two cases of forty years or more. The average figure is 18.2 years. The middle third fall in the range of from 15 to 21 years.

The length of time devoted to purchasing work includes time spent in subordinate buying positions as well as at the head of the department. The extreme ranges are two cases of two years or less up to one instance of forty years. The average is 17 years. The middle third fall in the range of 14 to 20 years.

The individual case records were further analyzed to note the correlation, if any, between length of experience in purchasing and length of service in the company. In 57 cases (23.3%) the two periods coincided; the inference being that these men have grown up with the department. More significant is that fact that in 122 cases, or exactly 50%, length of service with the company exceeds the period of buying, indicating a general policy of bringing men from other departments of the company into purchasing work. It follows from this that these 50% of buyers have had prior experience in other branches of the company's activities, a valuable background for understanding of the problems of production, engineering and sales, which will be analyzed in detail a little later.

In 65 cases (26.6%), purchasing experience antedates the present company connection, indicating the more professional aspect of the work, where purchasing skill and experience have been enlisted for a definite functional service.

48% Are College Trained

Regarding the educational background, the study shows that one hundred and eighteen of the men (48.4%) have had college training, seventy-one of these (29.1%) having completed the course leading to a degree. Among this number there is a preponderance of technical training, as indicated by the degrees held. Twenty-nine of the seventy-one graduates (40.8%) hold the general course degrees in arts, philosophy, law or business administration. The other forty-two (59.2%) have scientific or engineering degrees. The detailed list follows:

B. S.	23
B. A.	20
M. E.	13
C. E.	5
B. C. S. or B. B. A.	3
Ll. B.	3
Ph. B.	3
E. E.	1

In addition, thirteen of these men have done graduate work leading to advanced degrees in chemical engineering (4), mechanical engineering (3), electrical engineering (2), civil engineering (1), and law (3), while other graduate work is reported in metallurgy, business administration, and education.

Among the group which is not college trained, no less than ninety-six have had courses in commercial schools, evening schools, university extension work, and the like. The majority of these (72) were in commercial subjects, management and accounting. Seventeen followed studies of a technical nature. The balance included traffic, design, law and aviation.

Practical Experience

On the practical side, 183 of these men, or 75%, have business or factory experience in addition to their purchasing work. They know what it is to handle and use the materials of industry; they have laid out designs on the drafting boards and have drawn off material lists; they have made the laboratory tests; they know mechanics of storekeeping and traffic management, of records, costs, and accounts; they have sold merchandise to other purchasing men and can meet the salesmen on the ground of common experience. Some of them have had experience in several of these lines, and in some cases the production, accounting or technical duties have been carried on along with buying.

One hundred of these purchasing men (41%) have been in production work, their average experience being 7.2 years. Sixty-eight (27.9%) are experienced in accounting, with an average of 7.0 years at such work. Fifty-one (20.9%) have held technical or engineering positions, for an average of 7.2 years. Thirty-three (13.5%) have been in sales work, for an average of 4.3 years.

Nine have been in traffic departments, for an average of 6.8 years. Six have been in stores work, for an average of 4.2 years. Others have had varied experience in construction, statistics, costs, credit,

Continued on page 91

THE MARKET PLACE

First - of - the - month quotations for carloads or mill shipments, with comparative prices quoted one month ago and one year ago

	Jan. 1 1939	Dec. 1 1939	Jan. 1 1940
ACIDS			
Acetic, 28%, cwt.	2.22	2.13	2.23
Muriatic, 18 deg., cwt.	1.50	1.50	1.50
Nitric, 36 deg., cwt.	5.00	5.00	5.00
Oxalic, Works, cwt.	10.75	10.75	10.75
Phenol, Works, cwt.	14.25	14.25	14.25
Sulphuric, 66 deg., ton	16.50	16.50	16.50

BUILDING MATERIALS			
Brick, N. Y. dock, per M	12.00	12.50	12.00
Cement, f.o.b. plant, bbl.	2.15	2.15	2.15
Glass, single B, per box	2.50	2.70	2.70
Lime, per bbl.	2.16	2.80	2.75
Nails, wire, per keg	2.45	2.55	2.55
Oak flooring, per M ft.	70.00	72.00	71.00
Southern pine, K.C., per M ft.	23.23	25.07	25.16
CHEMICALS			
Alcohol, denatured, gal.	.32	.31½	.31½
Alum, potash, cwt.	3.40	3.40	3.75
Alumina Sulf., Comm., Works, cwt.	1.15	1.15	1.15
Ammonia, aqua, 26 deg., drums	.02	.02¼	.02¼
Arsenic			
White, cwt.	8.00	3.00	3.00
Red, cwt.	15.75	18.00	18.00
Barium			
Chloride, ton	77.00	77.00	77.00
Carbonate, ton	56.50	56.50	56.50
Benzol, pure, gal.	.16	.16	.16
Borax, powd., ton	48.00	48.00	48.00
Chlorine, cwt.	2.00	1.75	1.75
Formaldehyde, lb.	.05¼	.05¼	.05¼
Glycerine, drums, lb.	.12½	.12½	.12½
Lead acetate, white, broken, cwt.	10.00	11.00	11.00
Nickel sulphate			
Double	.13	.13	.13
Single	.13	.13	.13
Potash			
Caustic, solid	.06¼	.06¼	.06¼
Permanganate	.18½	.18½	.18½
Sal Ammoniac			
Gran. white, cwt.	4.50	4.50	4.50
Gran. gray, cwt.	5.75	5.75	5.75
Saltpeter, crystals	.07½	.07½	.07½
Soda			
Ash, 58%, light, bulk, cwt.	.90	.90	.90
Caustic, 76%, solid	2.30	2.30	2.30
Sal, Works, cwt.	1.10	1.10	1.10
Sodium			
Bicarbonate, cwt.	1.70	1.70	1.70
Phosphate, cwt.	1.85	2.10	2.10
Silicate, 60 deg., cwt.	1.65	1.65	1.65
Sulphur, Comm., cwt.	1.60	2.60	2.60

COAL & COKE			
Anthracite, stove, mines	6.40	5.90	5.75
Bituminous, Cleaf. mine run	2.25	2.70	2.60
Bituminous, Pa. Grade A	2.40	2.50	2.50
Beehive Coke, Connellsville	4.00	5.00	5.00
By-product Coke, Newark	10.80	11.38	11.38
FERTILIZERS			
Muriate potash, 80-85%, per unit K20	.65½	.53½	.53½
Sulphate potash, 90-95%, bags	38.00	36.25	36.25
Nitrate soda, bulk	27.00	27.00	27.00
Sulphate ammonia, dom. bulk	28.00	27.75	28.00
Steamed bonemeal, 3 and 50, per ton	22.50	30.00	32.00
GRAINS			
Barley, malting, bu.	.68	.64	.69
Corn, No. 3, yellow, bu.	.53	.55¼	.56¾
Oats, No. 2, white, bu.	.32¾	.41	.42¼
Rye, No. 2, Western, bu.	.63⅜	.75⅝	.95⅛
Wheat, No. 2, hard winter, bu.	.69½	.87½	1.00
Flour, spring patents, 196 lbs.	4.60	5.70	6.30
HIDES			
Light native cows, lb.	.12	.14	.15
Heavy native steers, lb.	.12	.14	.15
Calfskins, 5-7 lbs., per skin	1.30	1.80	2.00

	Jan. 1 1939	Dec. 1 1939	Jan. 1 1940
IRON & STEEL			
Pig iron, foundry No. 2	21.00	23.00	23.00
Pig iron, basic, valley	20.50	22.50	22.50
Cast iron pipe	50.00	52.20	52.20
Forging billets	40.00	40.00	40.00
Sheet bars	34.00	34.00	34.00
Wire rods	43.00	43.00	43.00
Cold rolled sheets, cwt.	3.20	3.20	3.20
Hot rolled annealed sheets, cwt.	2.15	2.10	2.10
Cold rolled strips, cwt.	2 95	2.95	2.95
Hot rolled strips, cwt.	2.15	2.10	2.10
Tin plate, cwt.	5.35	5.00	5.00
Bars, cwt.	2.25	2.10	2.10
Shapes, cwt.	2.10	2.10	2.10
Bright wire, cwt.	2.60	2.60	2.60
Ground shafting, cwt.	2.70	2.70	2.70
Rails, ton	40.00	40.00	40.00
No. 2 heavy melting scrap, ton	8.50	13.50	18.00

METALS, NON-FERROUS			
Aluminum, virgin ingots	.20	.20	.20
Antimony, American, spot	.11¾	.14	.14
Copper			
Electrolytic	.11¼	.12½	.12½
Casting	.10¾	.12⅜	.12⅛
Lake	.11⅜	.12½	.12½
Chromium, 97%, spot	.85	.85	.85
Lead, E. St. Louis	.047	.0535	.0535
Nickel, ingot	.35	.35	.35
Quicksilver, flask	77.00	143.00	145.00
Silver, bars, N. Y., per oz.	.42¾	.34¾	.34¾
Tin, Straits, spot	.468	.52	.4925
Zinc, E. St. Louis	.045	.06	.0575
METAL PRODUCTS			
Copper wire, bare, cwt.	15.375	15.375	15.375
Yellow brass sheets, high	17.625	19.06	19.31

NAVAL STORES			
Turpentine, gal.	.305	.32	.3375
Rosin, Grade B, bbl.	5.10	5.40	5.40
PAINT MATERIALS			
White lead, dry, basic carbonate	.07	.07	.07
Carbon black	.03¾	.03¾	.03¾
Shellac, orange	.10½	.17	.20
Linseed oil	.085	.097	.108

	Jan. 1 1939	Dec. 1 1939	Jan. 1 1940

PAPER			
News, roll, ton	50.00	50.00	50.00
Book, M. F., cwt.	5.85	6.25	6.25
Wrapping, northern, cwt.	4.75	5.00	5.00
Wrapping, southern, cwt.	3.50	4.00	4.00
Wrapping, manila jute, cwt.	8.20	8.25	8.25
Chip board, No. 1, ton	27.50	45.00	45.00
Wood pulp, mech., ton	22.00	32.00	32.00
Wood pulp, sulph., No. 1, cwt.	2.00	2.00	2.00

PETROLEUM			
Crude, Mid-Continent	1.02	1.02	1.02
Crude, Penna.	1.18	1.95	1.95
Gasoline, 65 oct.	.05¾	.06¾	.06¾
Bunker Oil C	.95	1.15	1.15
Kerosene, 41-43 grav.	.0475	.051	.056
Penn. bright stock, light, 25 P.T.	.12	.25	nom.
Penn. cylinder oil, 600 flash	.10½	.17½	nom.

RUBBER			
Smoked sheets	.16⅛	.20⅜	.19¼

TEXTILES			
Cotton middlings, Galveston	.0841	.0976	.108
Cotton yarns, 22s	.21½	.27	.27½
Print cloths, 38½", 64x60	.04⅜	.05⅛	.05½
Sheeting, 37", 48x48	.04¾	.06¼	.06¼
Wool, fine combing, ½-blood	.67	.95	1.00
Worsted yarns, French 2-40s	1.47½	1.87½	1.87½
Worsted yarns, English 2-40s	1.35	1.76	1.73
Silk, Japan, double extra cracks	1.82	3.46	4.50
Rayon, viscose, 150, 40s	.51	.53	.53
Burlap, 10½-oz., 40"	.0495	.11	.104
Hemp, Manila	.05½	.07⅞	.07½

THE TIE THAT BINDS US TO COMFORTABLE OLD FRIENDS IS STEEL!

Everyone has a favorite pair of really comfortable shoes --- worn until the leather is thoroughly pliable, the shoes wholly comfortable. Ever stop to think that steel makes that possible? The average pair of shoes has 94 pieces of steel---which hold the shoe together, give it long life, make the modern shoe comfortable-- --in fact make it possible.

Almost everything in life today depends on steel--the clothes we wear, our transportation, the buildings we work in, the appliances that make modern life easier are of steel or made by steel machinery.

Not, of course, just any steel. The nails in your shoes are one type of steel, the tin-plated steel for packaging food is another, the sheet for your automobile body is a third. Youngstown maintains a great research department to make certain that on every order you place with us you will get the steel which will meet your requirements, and will help you produce a better product, at more profit to you.

★

QUALITY TRADE MARK YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices - YOUNGSTOWN, OHIO

Sheets - Plates - Pipe and Tubular Products - Conduit
Tin Plate - Bars - Rods - Wire - Nails - Tie Plates
and Spikes

25-15B

How much do 1000 letters cost?

For the best carbon paper and typewriter ribbons, MultiKopy and Star Brand, only $1.80 or 1%

Mr. Purchasing Agent! These figures are the result of a careful study of correspondence costs. They show conclusively that the per letter cost of *quality* carbon paper and typewriter ribbons is a small price to pay for neater letters and reliable office records.

Leading business offices have frequently benefited through the service of their nearby Webster Representative. He will also be glad to study your individual needs, without obligation to you. A careful check-up may not only simplify and improve your office work, but actually save you money. Write to us... we will have him call.

WEBSTER

CARBON PAPERS and TYPEWRITER RIBBONS

7 Amherst Street, Cambridge, Mass.

PERSONALITIES in the NEWS

WALTER ARMSTRONG, Purchasing Agent of the American National Bank, Chicago, addressed a recent meeting of the Chicago Chapter, American Institute of Banking, on the topic, "Bank Purchasing."

ROLAND M. BRENNAN is the new purchasing agent for the District of Columbia, succeeding MARION C. HARGROVE, whose retirement after fifty years of service was reported last month. Mr. Brennan was formerly secretary to the Board of District Commissioners.

THOMAS E. SAVAGE has been appointed purchasing agent of the Erie Railroad, with headquarters at Cleveland, succeeding the late F. W. Holt. Mr. Savage's entire business career has been in the purchasing department of the railroad, starting as a clerk in 1903. He became assistant purchasing agent in 1930. FRANK J. LOUGHLIN, who has been with the department since 1905, becomes assistant purchasing agent.

WALTER S. CONNOR has been named City Purchasing Agent at Lowell, Mass., by Mayor-elect George T. Ashe. He succeeds GEORGE MONAZYNSKI in the office.

WILLIAM F. STREMKE has been appointed purchasing agent of the Murphy Diesel Co., Milwaukee, succeeding Mr. Werk.

A. W. RUF retired last month from the position of General Purchasing Agent for the Cudahy Packing Co., Chicago, after rounding out a half century of service with the organization. He became associated with the Cudahy Co. in 1889, at the South Omaha plant, moving to Chicago in 1911, when headquarters were established in the latter city. In addition to his purchasing duties, Mr. Ruf was a member of the Board of Directors.

GORDON H. BAKER has been appointed purchasing agent of the Virginia Iron, Coal & Coke Co., Roanoke, Va., succeeding the late Marshall A. Shuff.

KARL L. BATES, Purchasing Agent of Matthews Hardwoods, Inc., Seattle, and president of the Washington Association, W. H. CROUCH, Purchasing Agent of the Snoqualmie Falls Lumber Co., and H. D. VAN EATON, State Purchasing Agent, were featured in a broadcast over Station KJR, Seattle, on December 4th, when they were interviewed by George F. Skiff, director of the "Buy Washington Products" program. Other purchasing men in the audience participated in the general quiz which went out over the air.

DOROTHEA HENNINGER has been named purchasing agent for the Transcontinental Broadcasting System, with headquarters in New York City.

HARRY TANZER has resigned as purchasing agent for the Federated Metals Co., St. Louis, and is now associated with the Duquesne Smelting Corp., Pittsburgh.

LEE S. GATY has been appointed purchasing agent for Franklin County, Ohio, a newly created office, effective January 1st. Mr. Gaty was formerly secretary of the City Purchasing Office at Columbus.

ROBERT SALISBURY has been appointed purchasing agent for Pass & Seymour, Syracuse, N. Y., succeeding D. E. PREST.

M. J. MORIARTY, Purchasing Agent of the U. S. Playing Card Co., addressed the class dinner of the Salesmanship group of the University of Cincinnati, on "The Salesman and the Purchasing Agent."

FRANK M. HOLLOWAY, formerly purchasing agent for the Freeport Sulphur Co., and more recently manager of the company's Houston office, has been transferred to New York, where he will direct the eastern sales office of the Vapor Recovery Systems Co.

CHARLES B. MCCLASKEY, for the past four years associated with the Biddle Purchasing Co., has joined the purchasing staff of the Ace Hardware Corp., Chicago.

HARVEY F. PHIPARD, JR., has been appointed purchasing agent of the Continental Screw Co., New Bedford, Mass., succeeding JOHN A. TURNER, who has been transferred to the credit department of the company.

MAYNARD HYLAND has been appointed secretary for the City Board of Purchase at Columbus, Ohio. He succeeds HAROLD LLOYD, who resigned to accept a private business position.

For additional products see Buyer's Directory, page 108

START THE NEW YEAR RIGHT!

—SAYS COL. CLIPPER

USE CLIPPER-LACED BELT JOINTS IN 1940...
AND ENJOY TROUBLE-FREE BELT OPERATION!

A Clipper-Laced belt joint is as flexible as the belt itself, crossways as well as length-wise. Each hook is independent — no carding material to prevent belt joint from conforming to a crown pulley . . . Clipper Lubrihide connecting pins last 2 to 4 times longer, because they have exclusive, permanent, internal lubrication, which eliminates binding and wear as the belt joints flex . . . Use Clipper Belt Hooks for ALL flat belts. You'll find LUBRIHIDE Pins packed as standard in all boxes of Clipper Hooks at NO ADDITIONAL COST!

CLIPPER BELT LACER COMPANY, GRAND RAPIDS, MICHIGAN, U.S.A.

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Clipper

BELT LACING EQUIPMENT

For additional products see Buyer's Directory, page 108

Among the ASSOCIATIONS

New Officers for 1940
Connecticut Association

President, R. C. Swanton of Winchester Repeating Arms Co., New Haven; *Vice Presidents*, L. D. Muldoon of Jenkins Brothers, Bridgeport, and H. W. Schwarz of the Robertson Paper Box Co., Montville; *Secretary*, F. A. Neumann of New Haven Clock Co.; *Treasurer*, J. P. Camp of Phoenix Mutual Life Insurance Co., Hartford; *National Director*, C. W. Leonard of the Bristol Co.

Hamilton Association

President, C. R. McNeil of Fuller Brush Co., Ltd.; *Vice Presidents*, G. A. Ireland of National Paper Goods, Ltd., and J. Frank Walker of Frost Steel & Wire Co., Ltd; *Secretary*, J. H. Burkholder of Dominion Foundries & Steel, Ltd.; *Treasurer*, Walter H. Furneaux of Aerovox Canada, Ltd.

Kansas City Association

President, J. M. Culver of Columbian Steel Tank Co.; *Vice Presidents*, J. E. Bowes of Skelly Oil Co., and C. O. Kimball of Kornbrodt Kornice Ko.; *Treasurer*, E. W. Wadlow of Cook Paint & Varnish Co.; *National Director*, W. E. Taylor of Western Light & Telephone Co.; *Executive Secretary*, R. C. Hopkins of Cinder Concrete Products, Inc., re-elected for his 17th term in this office.

Niagara Peninsula Branch

Chairman, A. Yule of Burgess Battery Co.; *Vice Chairman*, H. Cluderay of United Steel Corp., Ltd.; *Secretary-Treasurer*, K. C. Reece of Canadian Carborundum Co., Ltd.; *National Director*, J. G. Sexton of McKinnon - Columbus Chain, Ltd.

Tulsa Association

President, H. E. Kaiser of Phillips Petroleum Co., Bartlesville; *Vice Presidents*, J. S. Hawley of Stanolind Oil & Gas Co., and H. E. Heywood of National Supply Co.; *Secretary-Treasurer*, C. G. McLaren of Shell Oil Co.; *National Director*, C. D. Taylor of Barnsdall Oil Co.; *Executive Secretary*, H. M. Cosgrove; *Assistant Secretary*, E. R. Welch.

DECEMBER 1

ROCHESTER—Dinner meeting of the Rochester Sales Managers Club, at the Genesee Valley Club, with members of the *Rochester Association* as guests. Speakers: Thurman (Dusty) Miller, humorist, of Wilmington, and Roland B. Woodward of the Rochester Chamber of Commerce.

ST. LOUIS—Joint meeting of the *St. Louis Association* and the Sales Managers' Association. Speaker: Edward T. Gushee, Executive Vice President of the Union Electric Co. of Missouri, and formerly purchasing agent of the Detroit Edison Co.

LOS ANGELES—Annual Christmas Hi-Jinks of the *Los Angeles Association*, at the Elks Club. William C. Brooks and Gerald Selby were in charge.

"You get the Order because—"

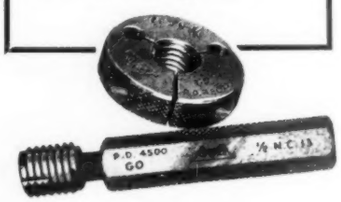
"We need these gages immediately and *'Greenfield'* is the only company that can deliver a substantial part of the order from stock." (The actual story behind a recent $3,000 gage order taken by a *"Greenfield"* salesman.)

* * *

No manufacturer can afford to wait around for gages in today's market—too costly! *"Greenfield"* realizes this—and has built up its stocks and facilities to give *speedy service* as well as super-accuracy.

"REX FINISH" GAGES FOR LONGER LIFE

"Greenfield's" "Rex Finish" is a special surface treatment which increases the life of a gage—guaranteed not to chip or crack in use and makes for much longer life.



GREENFIELD TAP & DIE CORPORATION, GREENFIELD, MASS.

Detroit Plant: 2102 West Fort St. Warehouses in New York, Chicago, Los Angeles & San Francisco. In Canada: Greenfield Tap & Die Corp. of Canada, Ltd., Galt, Ont.

GTD GREENFIELD

TAPS · DIES · GAGES · TWIST DRILLS · REAMERS · SCREW PLATES · PIPE TOOLS

For additional products see Buyer's Directory, page 108

CHAIN and CABLE
Primary Products
of American Chain & Cable

OTHER ESSENTIAL "ACCO" PRODUCTS

CHAIN—Weed Tire Chains
Welded & Weldless Chain & Attachments
AMERICAN CHAIN DIVISION

CABLE—Tru-Lay Preformed Wire Rope and Crescent Non-preformed Wire Rope
AMERICAN CABLE DIVISION

BRAKES—Tru-Stop Brakes for Trucks & Buses. Tru-Level Oil Controller
AMERICAN CABLE DIVISION

CUTTING MACHINES—Wet Abrasive Cutting Machines—Nibbling Machines
ANDREW C. CAMPBELL DIVISION

CHAIN BLOCKS—and Trolleys
FORD CHAIN BLOCK DIVISION

WIRE ROPE—Lay-Set Preformed Wire Rope—Nonparell Non-Preformed Wire Rope
HAZARD WIRE ROPE DIVISION

IRON—Bars and Shapes
HIGHLAND IRON & STEEL DIVISION

AUTOMOTIVE EQUIPMENT—for garages and service stations
MANLEY MANUFACTURING DIVISION

SPRINGS—Owen Springs and Units for Mattresses and Furniture
OWEN SILENT SPRING COMPANY, INC.

FENCE—Page Fence, Wire and Rod Products, Welding Wire
PAGE STEEL AND WIRE DIVISION

VALVES—Brass, Iron and Steel—and Steel Fittings
READING-PRATT & CADY DIVISION

CASTINGS—Electric Steel Castings and Malleable Iron Castings
READING STEEL CASTING DIVISION
AMERICAN CHAIN DIVISION

HOISTS and CRANES—Wright Chain Hoists, Electric Hoists, Cranes
WRIGHT MANUFACTURING DIVISION

South Pole Snow Cruiser Equipped with American Chain and Cable

● The Research Foundation of Armour Institute of Technology, which planned and built Byrd's $150,000 Snow Cruiser, decided that tire chains would not be necessary on the gritty, sand-like surfaces surrounding the South Pole. Thus, Weed Chains were omitted. But they equipped the Cruiser with No. 85 heat-treated ½" American Chain, to be looped in front of the Cruiser as a drag to stop while going down hill. A similar chain attached to the stern will be used to prevent sliding backwards.

American Cable Tru-Lay preformed wire rope will be used for three purposes: To haul the airplane to the roof. To handle the 1200 pound spare tires. To winch haul the Cruiser out of pits or crevasses.

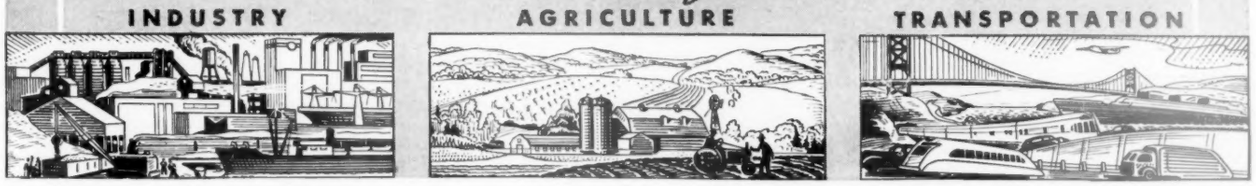
Among the other products of American Chain & Cable carried by the expedition, are Ford Hoists, choke collars and tethering chains for the dogs, repair links and rope snaps.

All of which comes to this—where lives are at stake men turn instinctively to the American Chain & Cable Company. A few of the 137 Pedigreed Products are listed at the left.

In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, Inc. BRIDGEPORT CONNECTICUT

Serving



DECEMBER 2

FORT WORTH — Meeting of *District Council No. 2, N. A. P. A.* Vice President W. L. James of Tulsa presided, and representatives attended from Dallas, Fort Worth, Houston, Oklahoma City and Tulsa Associations.

DECEMBER 5

OAKLAND—Luncheon meeting of the *East Bay Group, Northern California Association,* at the Lake Merritt Hotel. Speaker: Jack Ober of the Alameda County Treasurer's Office, "Serious and Humorous Items that Appear on Opening Safe Deposit Boxes of Estates."

DECEMBER 6

LOS ANGELES—Special dinner meeting of the *Los Angeles Association,* as guests of Barker Brothers, Inc.

DECEMBER 8

SAN FRANCISCO—Stag dinner and Christmas Jinks party of the *Northern California Association,* at the St. Francis Hotel. Walter H. Levy was chairman.

WARREN, PA.—First annual Christmas party of the *Northwestern Pennsylvania Association,* at the Conewango Club.

WORCESTER—Christmas dinner party of the *Worcester County Association,* at Putnam & Thurston's. Frank E. Colesworthy of Crompton & Knowles Loom Works was master of ceremonies.

ALLENTOWN—Annual dinner dance of the *Lehigh Valley Association,* at the Americus Hotel. The committee in charge consisted of Robert McLarin, Chairman, H. R. Chidsey, I. L. Bush, G. M. Overfield, Robert Yoder, and Clarence Fehnel.

DECEMBER 8-9

CHARLOTTE, N. C.—Annual meeting of the *Carolinas Virgina Association,* at the Hotel Charlotte.

Friday afternoon: Forum on business conditions and the outlook for 1940, led by J. J. Barnhardt of Cannon Mills.

Friday evening: Annual banquet, President C. W. Coker presiding. Speaker: Donald G. Clark, Director of Purchases for the Gulf Oil Corp., Pittsburgh, and chairman of the N. A. P. A. Educational Committee.

Saturday morning: Business session and annual reports of officers and committees. Address by J. W. Knowlton, Association Economist, "What the Financial Barometers are Saying."

Saturday afternoon: Tour of inspection at the Duke Power Company's Riverbend Steam Station, *or* All-Star High School football championship game at the American Legion Memorial Stadium, *or* golf at the Charlotte Country Club.

The following officers were elected for 1940: *President,* Roy C. Haberkern of R. J. Reynolds Tobacco Co., Winston-Salem; *Vice President,* Wert Faulkner of the Blue Ridge Co., Glasgow, Va.; *Secretary-Treasurer,* R. V. Spangler of Mill Power Supply Co., Charlotte. The first annual award of the trophy for outstanding contributions to purchasing was made to W. G. Thomas of Mill Power Supply Co.

DECEMBER 9

TULSA—Annual President's and Ladies' Night dinner dance of the *Tulsa Association,* at the Tulsa Club.

DECEMBER 11

NEW ORLEANS—Dinner meeting of the *New Orleans Association,* at the St. Charles Hotel. Speaker: Mark Bartlett, information agent for the Farm Security Administration in New Orleans. Mr. Bartlett cited four factors in municipal growth—industry, agriculture, commerce and tourist trade, all of which are present in New Orleans.

This ENGINEERED SOCKET Saves Muscle and Minutes — FOR USERS OF PARKER-KALON SOCKET SCREWS

SUPERIOR SOCKET DESIGN PLUS UNIQUE PRODUCTION CONTROL — in Parker-Kalon's laboratory, makes every socket perfect in shape, size, depth, centricality. A wrench enters this True-Fit, Flat Base Socket QUICKLY and makes a POSITIVE ENGAGEMENT. Rounding-out is prevented. Costly splitting is overcome, too, by the design and Parker-Kalon Cold-forging which concentrates metal where strains are greatest.

"16 POINT QUALITY-CONTROL" Leads Critical Buyers to Demand PARKER-KALON

Socket Dimension Tests are only one part of the 16-check routine on important characteristics of Parker-Kalon Cold-forged Socket Screws. In a laboratory without counterpart in the industry, quality is guarded by tests and inspections covering:

1—Chemical Analysis. 2—Tensile Strength. 3—Ductility. 4—Torsional Strength. 5—Ability to take Shock Loads under Tension. 6—Resistance to Shock Loads under Shear. 7—Hardness. In addition, there is a rigid inspection of these essentials: 8—Head Diameter. 9—Head Height. 10—Concentricity of Head to Body. 11—Socket Shape. 12—Socket Size. 13—Socket Depth. 14—Centricality of Socket. 15—Class 3 Fit Threads. 16—Clean Starting Threads.

In this way Parker-Kalon maintains a new higher standard of quality in Socket Screws . . . a standard that satisfies critical buyers. Send for free samples . . . see for yourself.

PARKER-KALON CORP., 206 Varick St., New York.

PARKER-KALON Cold-Forged SOCKET SCREWS

For additional products see Buyer's Directory, page 108

JOT THAT DOWN ON YOUR MEMO PAD!

He will show you how to establish the right ratio of tube cost and tube life to effect the lowest possible tube expense.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO
Steel and Tube Division

TIMKEN
SEAMLESS STEEL TUBES

For additional products see Buyer's Directory, page 108

BOSTON—Christmas meeting of the *New England Association,* at the Hotel Statler. R. H. Murray was chairman of the committee.

COLUMBUS — Dinner meeting of the *Columbus Association,* at the Elks Club. Sound motion picture, "Copper, from Mine to Market," presented through courtesy of the Phelps-Dodge Copper Products Co. There was a round table discussion on war purchases.

PORTLAND — Dinner meeting of the *Oregon Association,* at the Mallory Hotel. Speaker: Carl C. Donaugh, U. S. District Attorney, who summarized the highlights of the International Law Enforcement Conference, held at Mexico City, November 11th to 15th.

DECEMBER 12

NEW YORK—Dinner meeting of the *Metropolitan Purchasers' Assistants Club,* at the Hotel Great Northern. Speaker: Theodore M. Johnson, Supervisor of Purchases, New York University, "Unusual Experiences in Purchasing." Forum discussion on "Routing of a Purchase Requisition," led by V. L. Lewis of General Chemical Co. The annual Christmas party of the Club followed the business session.

The QUALITY
of a product depends upon
the quality of its parts...
ONE tiny part — poor in quality — can spoil an otherwise perfect product. That is why the springs you choose, as simple as they may be, must match the high standard of quality of the other parts you assemble in your product. Accurate offers you those springs.
One of our proudest accomplishments is a reputation for quality. We have built it over a period of years by supplying industry with the finest springs it is possible to make. We want you to have the advantages of Accurate quality — reliability and service. Whatever your requirements may be: compression, extension and torsion springs: wire forms and stampings; let us go over them with you.
Ask for the new Accurate Handbook
ACCURATE
Springs
ACCURATE SPRING MANUFACTURING CO.
3825 W. LAKE STREET • CHICAGO, ILL.

MILWAUKEE—Dinner meeting of the *Milwaukee Association,* at the Elks Club. Speakers: George Ballhorn, Chairman of the Wisconsin State Board of Pardons, "Crimes of Criminals"; and Lewis D. Thill, Congressman, who spoke on his impressions of the European situation, based upon a recent trip to Norway.

ST. LOUIS—Dinner meeting of the *St. Louis Association,* at the Hotel York. Speaker: Dr. Harry J. O'Neil, head of the Economics Department, St. Louis University, "The Effect of World Conditions on Business." The following officers were elected for 1940: *President,* Herbert DeStaebler of Lambert Pharmacal Co.; *Vice Presidents,* J. J. Sharkey of Western Cartridge Co. and George H. Brown of Century Electric Co.; *Secretary,* Paul O'Brien of Frank Adam Electric Co.; *Treasurer,* Irving C. Peppel of General Metal Products Co.; *National Director,* William G. Smith of James R. Kearney Corp.; *Executive Committee,* B. J. Jostrand of Larkin Packer Co., C. Hy. Brown of Liggett & Myers Tobacco Co., and Conrad Hailparn of Gaylord Container Corp.

PARKERSBURG, W. VA.—Dinner meeting of the *Tri-State Association,* at the Chancellor Hotel.

DECEMBER 13

TORONTO—Annual Christmas party of the *Toronto Association,* at the Royal York Hotel.

KANSAS CITY—Annual meeting of the *Kansas City Association,* at the Kansas City Club. Speaker: Major P. L. DeBevoise, head of the Salvation Army in Kansas and Missouri, "Why a Merry Christmas?"

AKRON — Annual Christmas party and dinner dance of the *Akron Association,* at the Akron City Club.

BUFFALO—Annual Christmas party of the *Buffalo Association,* at the Hotel Lafayette.

ELKHART—Annual Ladies' Night dinner meeting of the *South Bend Association,* at the Hotel Elkhart. Speaker: Rev. Trevor V. D. Dillon, D. D., "The Viking People and the Russian Menace," based on observations during extensive travel in Europe over a period of several years.

DECEMBER 14

CHICAGO—Dinner meeting of the *Chicago Association,* at the Hotel Sherman. Three members of the University of Chicago faculty conducted an informal round table

For additional products see Buyer's Directory, page 108

discussion of "Purchasing"—Dean William H. Spencer of the School of Business, Assistant Professor of Finance Neil H. Jacoby, and Professor of Statistics Theodore O. Yntema. Commodity discussion was led by Thomas Anderson.

SAN FRANCISCO — Luncheon meeting of the *Northern California Association,* at the Palace Hotel. Speakers: William C. Hubner, "National Association Affairs"; Carleton B. Hutchings and Larry Duerig, "Chart Use and Interpretation as a Working Tool for Better Purchasing."

DAYTON—Dinner meeting of the *Dayton Association,* at the Engineers Club. Speaker: Dr. Howard E. Fritz, general manager of the Koroseal and synthetic products department of the B. F. Goodrich Co., Akron, who spoke on recent developments in that field.

INDIANAPOLIS — Annual Christmas party of the *Indianapolis Association,* at the Columbia Club.

TROY—Dinner meeting of the *Eastern New York Association,* at the Troy Club. Speaker: Prof. W. F. Spafford, head of the Department of Economics and Business Administration, Rensselaer Polytechnic Institute, "The Dilemma in Economic Theory." The meeting was preceded by a trip through the plant of the Allegheny Ludlum Steel Corp., at Watervliet.

BOSTON—Luncheon and tour of inspection, by the *New England Association,* aboard the Steamer *Acadia* of the Eastern Steamship Lines, at India Wharf.

SEATTLE—Dinner meeting of the *Washington Association,* at the Olympic Hotel. Grant Butterbaugh, Associate Professor of Statistics in the College of Economics and Business, University of Washington, analyzed Dr. Haney's business barometer charts. Commodity forum, led by Harry Beetham of Luckenbach Steamship Co., Harry Miller of Electrical Products Consolidated, J. B. Veilleux of Carnation Co., and J. V. Reardon of Barde Steel Co. Motion picture, "Copper from Mine to Market," shown by Homer Hussey, Northwest representative of Phelps-Dodge Copper Products Corp.

PHILADELPHIA — Annual meeting of the *Philadelphia Association,* at the Bellevue Stratford Hotel. The following officers were elected for 1940: *President,* Milton L. Draper of E. I. du Pont de Nemours & Co., Newark; *Vice Presidents,* Joseph I. Kitchin of the Lanston Monotype Machine Co., and Ralph E. Frazer of the General Accident, Fire & Life Assurance Corp.; *Secretary-Treasurer,* E. B. Ayers, Jr., of Proctor & Schwartz, Inc.; *National Director,* Harry E. Keeler of James Lees & Sons, Bridgeport.

HOLYOKE—Annual Christmas meeting of the *Western Massachusetts Association,* at the Hotel Roger Smith. E. E. Foote of Worthington Pump & Machinery Corp. was chairman of the entertainment.

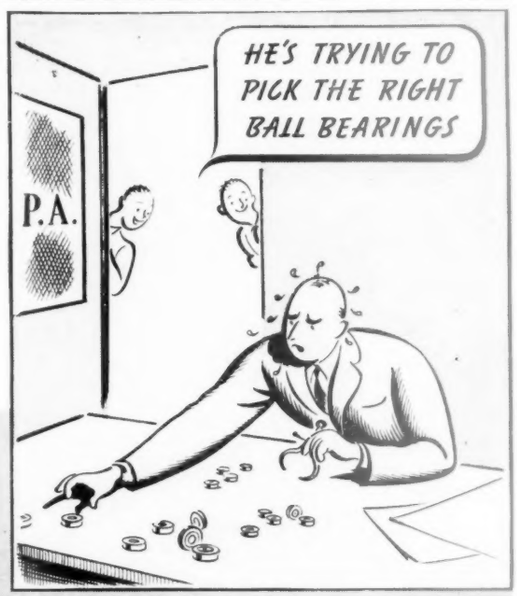
DECEMBER 15

LOS ANGELES—Annual family Christmas party of the *Los Angeles Association,* at the Elks Club. Phil Baum was chairman of the committee in charge of arrangements.

MONTREAL—Salesmen's Night dinner meeting of the *Montreal Association,* at the Mount Royal Hotel. Speaker: D. Henshaw of A. McKim, Ltd., "Barnacles and Their Relationship to the Ship of Life."

DECEMBER 16

CHICAGO—Seventeenth annual family Christmas party of the *Chicago Association,* at the Hotel Sherman. The committee in charge included T. R. Willard, *Chairman,* R. L. Krueger, W. L. Selle, Roy Carlson, and J. P. Franks.

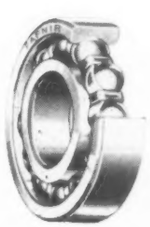


But Micrometer Measurements

WON'T GIVE THE ANSWER!

The things that make a good ball bearing supplier can't be defined by this method. For there's a lot beside the bearings themselves to compare, when you're choosing your source of supply.

Take *Range of Products,* for example. The balanced line of Fafnir Ball Bearings includes every type and size of radial and thrust bearing, precision bearing, self-aligning bearing, sealed bearing, and housed transmission unit to provide the most complete line in America. Thus manufacturers who standardize on Fafnirs for original equipment or replacement enjoy the benefits that come with meeting *every* bearing need from a *single, dependable source.*



Plant facilities . . . engineering help . . . service . . . tried and tested designs . . . these qualifications are the ones to be measured for lasting satisfaction. And *on* these points, you will find that the Fafnir organization matches the high standards of the Fafnir product. The Fafnir Bearing Company, New Britain, Connecticut.

FAFNIR *Ball Bearings*

THE BALANCED LINE • MOST COMPLETE IN AMERICA

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BRIDGEPORT—Annual Christmas party of the *Salesmen's and Purchasing Agents' Association,* at the Stratfield Hotel. John Walters was master of ceremonies.

CINCINNATI—Annual Christmas dinner dance of the *Cincinnati Association,* at the Hotel Gibson. Lawrence L. Werner was chairman of the committee in charge, assisted by Albert B. Closs, George DeSilver, E. C. Frederick, Lawrence Fryburger, Andrew Kueffner, Ralph C. Lewis, Raymond Potts, John Schneider, Arthur Tieman, Bernard J. Toerner, and Arthur W. Wheeler.

CLEVELAND—Annual Christmas party and dinner dance of the *Cleveland Association,* at the Hotel Cleveland.

NEWINGTON, CONN.—Stag Christmas party of the *Connecticut Association,* at the Indian Hill Country Club.

ST. LOUIS—Annual Christmas party of the *St. Louis Association,* at the Hotel Jefferson.

DECEMBER 18

SAN FRANCISCO—Fifteenth annual family Christmas party of the *Northern California Association,* at the St. Francis Hotel. Lon Cheyney was chairman.

NEW YORK—Plant visit of the *Metropolitan Purchasers' Assistants Club,* at the Berlin & Jones Envelope Co.

DECEMBER 19

PITTSBURGH—Annual family Christmas party of the *Pittsburgh Association,* at the Pittsburgh Athletic Association. Dinner, entertainment, bridge and dancing. William H. McKenna was in charge of the arrangements.

NEW YORK—Annual Christmas dinner and party of the *New York Association,* at the Builders' Exchange Club.

ERIE—Annual Christmas party and dinner dance of the *Erie Association,* at the East Erie Turners' ballroom.

LOUISVILLE—Christmas party of the *Louisville Association,* at the Kentucky Hotel. A huge Christmas card, signed by all members, was sent to William Kerrick, charter member and past president, who was confined to the hospital, recovering from a serious illness.

DECEMBER 21

SAN FRANCISCO—Luncheon meeting of the *Northern California Association,* at the Palace Hotel. Sound motion picture, "Reflecting Our Confidence in the Future of America," presented through courtesy of Maurice C. Jones, sales manager of Anheuser Busch, Inc.

ROCHESTER—Annual Christmas party of the *Rochester Association,* at the Rochester Club. W. Bert Bayer was chairman of the committee in charge.

DECEMBER 28

DALLAS—Ladies' Night dinner meeting of the Dallas Association, at the Stoneleigh Hotel. The committee in charge included B. A. Phillips, J. R. Brown, W. G. Nash and J. E. Jonsson.

Bloch-Laine Directs French Purchases

FREDERIC BLOCH-LAINE, of the international banking house of Lazard Freres & Cie., has been named Director of the French Purchasing Commission in New York, and has opened offices at 15 Broad Street. While maintaining separate offices and personnel, the French commission is working closely with the British purchasing board. The two organizations are jointly designated as the Anglo-French Purchasing Board in the United States, of which Arthur B. Purvis is chairman and M. Bloch-Laine vice chairman.

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Steels That Stimulate Progress

THE THOMAS STEEL CO.
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL
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For additional products see Buyer's Directory, page 108

The Buyer's Bookshelf

100 PACKAGING CASE HISTORIES, compiled by Albert Q. Maisel, Editor of *Modern Packaging* and the *Packaging Catalog*. Users of packages, as well as package manufacturers, looking for complete experience data on package design and re-design, will find an unusually comprehensive and helpful reference in this compilation of case histories covering 100 representative cases, involving the thought and methods of several hundred individual designers, production men, sales managers, and package manufacturers. The treatment is intensely practical throughout. It includes a resume of the product, market area, and marketing conditions; before-and-after photographs of the containers, showing both the old and new packages, and strikingly illustrating the changes effected; comparative data on both packages, includes comparative costs and noting any plant changes made necessary by the change; and the sales achievement of the new package. The cases have been selected so as to show a wide variety of products, including drugs and cosmetics, food, confectionery, hardware, liquors and beverages, sporting goods, stationery supplies, and textile items, so that virtually any problem will have a comparable case discussed. Arranged for ready reference, the book is attractively prepared. 224 pages, stiff binding. Published by the Breskin Publishing Co., New York, N. Y. $2.50 per copy.

HANDBOOK OF INFORMATIVE LABELING, new 1940 edition. 64 pages of useful information, bringing up to date this compilation of concrete data and ideas on the physical aspects of informative labels, for the benefit of manufacturers, retailers, advertisers, home economics experts, testing laboratories, and consumer organizations. The handbook covers the Federal Food Drug and Cosmetic Act and what it means to the manufacturer and packer; a check list and directory of organizations backing the consumer movement; the purpose of informative labeling, with charts showing the data desired by retailers and consumers on such labels; 30 pages of illustrations showing outstanding labels, and 7 additional pages of design suggestions; suggestions on paper selection and physical application of labels; suggestions for merchandising informative labeling. Compiled and published by the McLaurin-Jones Co., Brookfield, Mass. Printed in two colors, paper bound. 50 cents per copy.

FLOORS AND FLOOR COVERINGS, by Cornelia D. Plaister; No. 2 in a series of "Library Equipment Studies." Written primarily from the standpoint of use and maintenance in public library installations, this treatise has direct application to flooring conditions in all sorts of offices, auditoriums and public buildings. In separate chapters it deals with the principal types of floor materials—asphalt tile and flooring, concrete, cork carpet and tile, gypsum, linoleum, magnesite, marble, rubber, slate, terrazzo, tile, and wood. Under each of these headings is a discussion of recent developments in the material; its advantages, disadvantages, and proper sphere of use; general specifications for laying, including requirements of the subflooring; instructions for maintenance; a list of the principal commercial types available, with their special characteristics; and a directory of the principal manufacturers. There is also a general chapter on maintenance methods and equipment. 75 pages, paper cover. Published by the American Library Association, Chicago, Ill. 75 cents per copy.

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War Purchasing

WHEN the British and French governments established their war purchasing offices in this country last fall, with material budgets amounting to billions of dollars, there was some reason to believe that other governments might adopt a similar organization method and send "purchasing missions" to safeguard their own channels of supply for materials from this country. At that time it was quite generally accepted that the impact of war demand would affect, directly or indirectly, practically every type of product and every field of industry, thereby touching the commercial requirements of non-belligerent nations as well as the combat and living requirements of those at war. With some markets cut off, and with considerable sectors of production diverted from normal to wartime activity, a major economic and commercial adjustment seemed to be in order, with the building up of reserves of all sorts as an important feature of the new program. It was this probability that prompted the warnings against setting up a buying competition which might create a more or less artificial scarcity and send prices rocketing.

Up to the present time, however, no such development on the part of national interests has taken place, and it now appears to be only a remote possibility. Purchases for other governments are proceeding in much the normal course, without the element of emergency buying. A canvass made by PURCHASING, covering every consular office in New York City, elicited the information that no other government has such a mission in effect, or in contemplation for the time being. Such an announcement is of course highly stabilizing, and calculated to offset the possibility of undue competition in purchasing. We know of course that the belligerent nations are definitely in the market for a variety of supplies. Finnish envoys have been active, and there is a steady inquiry from the Far East. The Amtorg Corporation still represents the U.S.S.R. in American markets, but with no evidence of unusual activity. Unofficially we have information that two governments, neither of which is a present belligerent, are surveying the situation, but the establishment of a purchasing mission, as such, is wholly undecided in either case.

Meanwhile, a completely coordinated policy by the Franco-British representatives has most effectively dissipated the threat of artificial competition for materials and has established them rather in the position of large and desirable customers. In comparison with the experiences of the World War a quarter of a century ago, this ranks as one of the neatest purchasing achievements on record.

There are three factors which have contributed substantially to this effect. The first of these is the very conservative tempo of the buying, despite the enormous volume which is being handled—a program made possible by the correspondingly gradual tempo

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of hostilities, both in the stages leading up to the war and in the development of military activities on the war front.

The second is the limitation of war purchases, thus far, to supplies of a definitely military nature. For the most part, those related requirements which were expected to follow in the wake of the armament purchasing program, have been deliberately subordinated. Domestic food prices were among the first to react very sharply to the news of war, presumably on the supposition that large quantities of food supplies from this country would be requisitioned and that similar large quantities from other neutral sources would be diverted to wartime use. The actual development has followed other lines. Foodstuffs from various parts of the British Empire have been practically nationalized, but extra demand for such products from neutrals has been almost negligible, and recent policies of food rationing abroad indicate that this potential demand, while still a factor, will be minimized as a war measure and will be deferred until a more stringent emergency arises. Military and industrial requirements have been given the priority. A similar situation exists with regard to textile materials and in other fields.

The third factor, affecting our trade with both belligerent and neutral nations, is our own national policy of reciprocal trade agreements. At the moment this is a somewhat uncertain factor, dependent upon the outcome of Congressional action in the present session.

There has, of course, been a notable volume of direct war purchasing, the chief beneficiaries being the aeronautic, automotive, machinery and chemical industries. Trade statistics on this point are impressive, and there is visual evidence in the large stocks assembled at the New York Foreign Trade Zone free port, awaiting shipment. Aside from the Franco-British program, which is outstandingly the largest buying project, there has been in recent weeks an unexpectedly aggressive buying program on the part of Finland.

Rumor had discounted Finnish war purchases as any great factor, but despite this opinion, Finland is definitely seeking mili-

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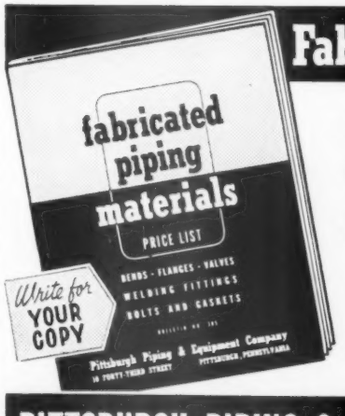

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tary supplies in this country. A widely accepted story was to the effect that the Finnish procurement program was limited to plans for taking over military equipment that had been ordered by Poland just prior to the war. That, however, has little basis in fact, so far as can now be determined, and Polish representatives in this country are on record as declaring that no such orders were ever placed. Another report was that Finland's chief interest was in gas masks, but that also appears to be a secondary objective.

Finland's primary interest at the moment is in aircraft and munitions. Thus far, forty-four planes have been secured from this country—a lot originally ordered by the Navy, whose priority rights were waived in favor of the Scandinavian purchasers. It is thought probable that a similar diversion may be accomplished with respect to planes now on order for France and Great Britain, a logical move under the pledges of assistance made public by these two powers. In that event, it would actually represent additional business, for replacement orders would be issued to restore the original purchases to their contemplated volume.

Another factor, of really great proportions, is our own program of national defense. While the actual appropriation is still pending, it is evident that the program will be broad in nature and extremely large in volume. Every effort will be made to keep this procurement on an orderly basis. It will provide a powerful stimulus to production, but is to be accomplished with a minimum of disruption to normal activities and current markets. Even though government price controls may not be invoked, strong sentiment against undue market advances has been developed, notably assisted by the sound long-range policies announced by manufacturers who will be participants in the program.

Meanwhile, under existing policies and appropriations, our accumulation of strategic materials continues. The Navy Department has resumed its program of buying tin, and stocks of other materials of foreign origin are being increased by both governmental and industrial users.

For additional products see Buyer's Directory, page 108

Foreign Trade Balance, 1939

A REPORT issued this month by Secretary of Commerce Harry L. Hopkins shows that exports of U. S. products increased slightly in 1939 to a value of 3.1 billion dollars, as compared with 3.094 billion dollars in 1938. During the same period, imports increased from a value of 1.96 billion dollars to 2.3 billion dollars. The trade balance for the year is therefore favorable by approximately 0.8 billion dollars, as compared with 1.1 billion dollars in 1938.

In commenting upon developments of the year, Secretary Hopkins stated:

"In recent years, finished and semi-finished manufactures combined have accounted for nearly two-thirds of the total export value. Crude materials have comprised about one-fourth of all exports, while crude and manufactured foodstuffs have made up the remainder. By contrast, shipments to foreign countries in the period preceding the World War consisted of one-third crude materials, principally cotton, and one-fifth of crude and manufactured foodstuffs, including wheat and flour. Finished manufactures comprised less than a third of total exports, and finished and semi-finished manufactures less than half.

"Since European countries were the principal markets for crude materials and foodstuffs, it follows that U. S. exports to Europe in recent years have comprised a smaller proportion of total exports.

"Shipments to European countries during the five-year period preceding the present conflict were approximately two-fifths of shipments to all countries, while in the same period preceding the World War they were three-fifths of the total. Exports to other world areas have increased without exception in relative importance since the World War.

"Whether the rather widespread expectations of a marked rise in export trade, which provided most of the basis for the business expansion in the fourth quarter of 1939, will be realized depends in large part upon the future course of the war in Europe. For the first three months of the war there has not been a significant increase in our export trade. Nevertheless, if the character of the war changes so as to require a larger volume of materials, it is likely that business in this country will receive larger orders from the Allies, even though these orders do not reach the magnitude attained during the World War.

"Among circumstances which tend to limit the export movements during the present war are the various controls which have been imposed upon foreign commerce by the belligerent powers since the beginning of the war. Import controls and other restrictive measures have already affected adversely the principal European markets for a variety of export commodities, chiefly war non-essentials.

"Among the anticipated dislocations in foreign trade as a result of the outbreak of war in Europe were a virtual stoppage of direct shipments to Germany and marked limitations on indirect shipments. This development, however, did not affect our total trade as seriously as at the time of the World War. In 1914 Germany took approximately one-third of the exports of cotton, then the leading item in U. S. export trade, and 15% of total exports from this country. In recent years, on the other hand, exports to Germany have been relatively small, and, in fact, diminishing in importance. In 1938, for example, shipments to Germany were less than 3½% of total exports.

"Although the estimated value of exports in 1939 shows no appreciable change from the 1938 total, important changes occurred in the shipments of particular commodities: For example, exports of iron and steel-mill products during the first eleven months of 1939 were valued at approximately 202 million dollars, as compared with 138 million dollars during the corresponding period of 1938. Similarly, exports of metal working machinery showed a rise from 91.47 million dollars to 104 million dollars, and those of aircraft from 62.5 million dollars to 88 million dollars. Various other items, including chemicals and rubber manufactures, showed appreciable gains. The principal item among manufactured products which declined in value was that of automobile passenger cars, which fell from 87.15 million dollars during the first eleven months of 1938 to approximately 77 million dollars in the corresponding period of 1939."

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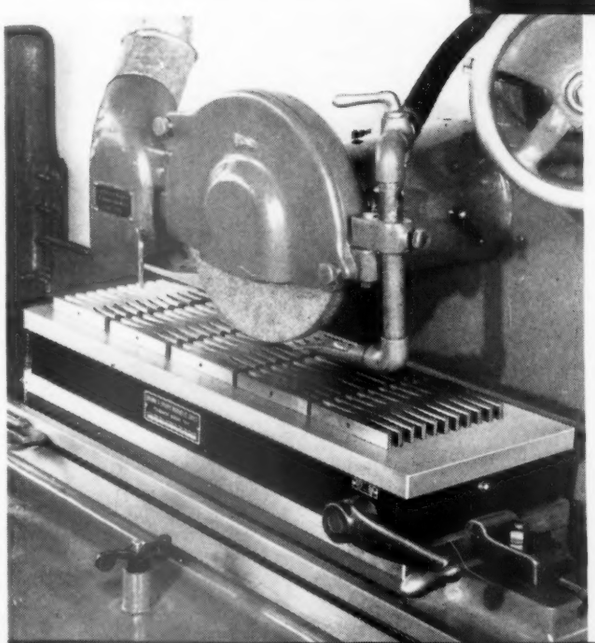

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Transmission Chain

(Continued from page 67)

Suitable casings provide protection and automatic lubrication. They also add to safety of personnel in many locations. Proper lubrication is a vital factor, especially since some of the newer "extreme pressure type" lubricants are unstable under certain conditions, so that corrosion is induced, having a deleterious effect of the product. Adequate lubrication and clean operating conditions are the easiest way to get the lowest ultimate cost in chain drive.

Some machines so function that heaviest loads come on small sectors of sprockets and few sections of chains. There are mechanical ways of compensating for this so the wear is more evenly distributed. Those ways vary with chain types, sprockets, and maintenance programs of chain users.

Changes in sprocket sizes while keeping the same ratios of driven to driving sizes, will provide larger areas to absorb such synchronized wear. Slight changes in ratios, may make it impossible for the heavy loads to be constantly found by small sections of chain. "Hunting links," sometimes known as "offset links" or "half links," are an expedient to distribute wear without changing ratios, but their use is generally discouraged.

With some types of chains, broken or worn links can be replaced easily, with others they cannot.

Sprockets with large numbers of teeth or larger diameters, distribute their own wear over larger areas, have more links of chain engaged at one time thus lessening the wear on links, and require less bending of the chain thus cutting down the motion between links and pins or bushings. But with too large diameters, sprockets are unduly costly, require longer lengths of chain drive for drive, need too much room, and increase guard or casing costs.

For many drives, sprockets can be split. This may be a big advantage in original installation or in dismounting and replacing.

In nearly all cases, sprockets should be replaced when new chains are installed. This is because the chain changes its pitch slightly as it runs, wears and stretches. The old sprocket therefore may not be an exact fit for the new chain, though sprocket teeth are designed to accommodate the gradually increasing pitch of chains as wear progresses. Sprocket and chain need to wear and mate together.

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their initial efficiencies alone are acceptable for their first drives. Worn drives can be transferred to easier service. Most of them are easy to shorten or lengthen for new centers.

Many types of worn chain have incidental uses about factories. Counter weights may be suspended from them. They can hook up mutually operated remote controls. Flexible slings for pipes, or cradles for boxes, are made of them. They are used to pull fire doors closed. Mats are made of them for wear-prone areas of floors and tables.

On salvage, as with the other factors, the sales engineers can look forward and make suggestions. For with machine designs, products, processes and conditions changing as rapidly as they do today, it often is difficult to guess whether a chain drive will or will not be allowed to wear out on its original service.

Electrical Power

(Continued from page 69)

Discussion has been limited thus far to common ground and the advantages of consumer generation. To get a true picture it is necessary to consider the advantages of purchased power. When making your comparison of relative costs be certain to include all charges. At this point the disciples of consumer generation are likely to have a short memory. In addition to the initial cost, there is fuel, labor, lubrication, insurance, water, and space valuation. A reasonable percentage should be allowed for depreciation and repairs. By the same token, it may be noted that if the saving is large enough, the initial outlay may be retired on that basis. Many equipment manufacturers offer a contract on that basis. Government loans are available for this purpose.

Purchased power is more desirable if investigation shows that the initial investment for equipment is greater than the expected savings warrant. The capital structure of the interested company may be such that the funds available would show a greater turnover in the production end of the business.

If your business is in the position of proposed expansion, or if policies are unsettled, it may be advisable to defer action. The reason for delay is justified because the type of installation as well as

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Some industries are limited for space. In addition to the space required for the power plant, the question of fuel storage and handling will arise.

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If investigation warrants a change to consumer generation, be certain that your survey covers all angles, that the equipment is of the best, and the installation worthy of the equipment.

Another disadvantage in consumer generation is arrangement for auxiliary or standby service.

After taking all the cost factors under consideration, if you find only a very narrow margin of savings in favor of consumer generation, the best course is to continue buying your power. The procedure up to this point may at least aid you in making a more favorable rate agreement with your present source. It has been known to happen. A department store installed the equipment, put it into motion, and ended by purchasing their power. The utility made such an attractive rate that it was unprofitable to generate. However, without going this far, the old rate would have remained. The units still stand as a mute threat, except when serving as an auxiliary unit.

There are also advantages to purchased power that may seem obscure. In consumer generation the accounting procedure becomes more complex. You actually have an industry within an industry. When purchasing power, the cost is covered by one monthly bill. Consumer generation entails the keeping of power plant operating records. An extra payroll may have to be provided. Fuel purchasing may become a mild form of speculation. The purchasing department either has an added risk or a prestige making asset on its hands. Your budget must be more flexible to cover unseen contingencies.

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Harper

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CHICAGO STORE: 570 WEST RANDOLPH STREET

Background for Purchasing

(Continued from page 70)

planning, insurance and taxation, industrial relations, machine design, advertising, and banking.

Summary

The variety of experience cited above bears out the opening statement that no arbitrary standard or outline can be set as the norm for the training or experience in preparation for purchasing. Considerable attention and thought has been given in recent years to the most desirable background.

The consensus is that in the building of a competent purchasing department, management should seek men who are preferably (a) college trained, (b) technically trained, (c) equipped with practical production or engineering experience, (d) from their own organization, and should train these men in purchasing within their own department.

The present study differs from the other inquiries in that it deals not with opinions and aims, but with the facts of purchasing personnel.

It is interesting to note that in correlating the results of this survey with the standards previously established in those discussions of what is most desirable, we find that those objectives are being approached, in a very notable degree. To recapitulate briefly, in the light of these suggested standards, we find that the men in purchasing actually are

(a) college trained, 48.4%
(b) technical graduates, 17.2%
(c) experienced in production (41%) or in engineering (20.9%) — a total of 61.9% with an average experience of 7.2 years in such work
(d) drawn from the company organization (50%)

and trained and experienced in the company's own purchasing department with an average of 17 years experience in buying.

Looking to the future, it is reasonable to assume that with the conscious adoption of those standards, and with the more careful attention to personnel selection today, these percentages may be substantially raised from year to year.

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Old Chinese Proverb says—

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Industrial Consumers of Coal Testify

Industrial consumers of bituminous coal appeared this month before the Coal Division of the Department of the Interior, at Washington, discussing the proposed prices as affecting their own business requirements. The general tenor of the comment was that their competitive relationship with other companies would be thrown out of balance unless some downward revision were made in the proposed schedule.

The first witness was W. M. Richardson, president of the National Portland Cement Co., who testified that a number of plants in his industry, which were contemplating a program of modernization and rehabilitation, are withholding the installation of heating equipment in the belief that it may prove to be more economical to install systems using volatile slack or some other substitute fuel. That decision might be forced, he said, if an increase of 75 cents per ton on bituminous slack were put into effect, as now proposed by the Coal Division.

He said in part: "Many dislocations in our national economy have resulted from artificially high costs. In such cases and industry is forced to find new means of meeting competition, or go out of business.

"Another disturbing and bewildering factor in this price fixing scheme is the apparent conflict of government agencies in regard to industries affected. At the present time the United States Government, through its Federal Trade Commission, has charged the cement industry with the crime of fixing prices in cement while at the same time the United States Government, through this hearing, is taking the opposite course and will charge the coal producer with a crime if he doesn't fix the price of his coal. The cement industry is not only subject to constant attack on its price structure within its own ranks, but organized labor in the cement industry must compete with products manufactured by cheap labor of foreign countries."

Burlap Consumption Rises

Despite a sharp decline in the domestic cutup of burlap during December, to the lowest monthly consumption since the summer lull in July, the statistics for 1939 show a total use of 712 million yards, or a 3% advance over the 691 million yards used during 1938. Domestic stocks regained some of the abnormal declines caused by heavy war demands on the Calcutta mills, and rose 10% in the closing month of 1939 to 264 million yards, including both spot supplies and cargoes afloat.

For additional products see Buyer's Directory, page 108

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Low Cost GUARANTEED* STAPLING PERFORMANCE for OFFICE • STORE • FACTORY

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STAPLES OR PINS. GUARANTEED FOR A LIFETIME OF SERVICE. USES STANDARD STAPLES, LOADING CAPACITY 210.
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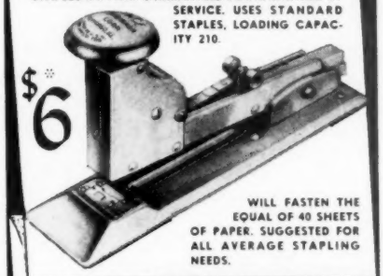
WILL FASTEN THE EQUAL OF 40 SHEETS OF PAPER. SUGGESTED FOR ALL AVERAGE STAPLING NEEDS.

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STAPLES OR PINS. USES STANDARD STAPLES. 105 CAPACITY.
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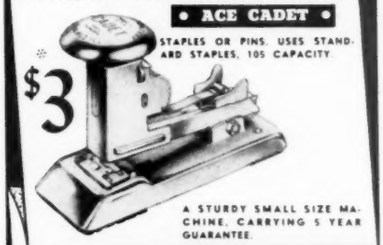
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IDEAL FOR DRAFTING ROOMS, FOR HOME, SCHOOL AND SMALL OFFICE USE.

*GUARANTEED • ACE STAPLERS ARE GUARANTEED NOT TO CLOG NOR JAM. ALL STEEL CONSTRUCTION; WEARING PARTS EXTRA HARDENED FOR LONG SERVICE. GUARANTEED BY THE MANUFACTURER AND BACKED BY YOUR DEALER.

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* Price East of Rockies

Good Purchasing is a Public Service

Addressing the annual convention of the Massachusetts Federation of Taxpayers Associations at Boston last month, Mrs. Edna B. Austin of Quincy, Mass., declared that "the greatest improvement in (Quincy's) municipal government in years was the establishment of centralized purchasing." Mrs. Austin cited savings of $35,000 to the taxpayers of the city in ten months of the department's operation, but found other features also worthy of commendation.

"The accomplishments of ten months' operation present a clear picture of its advantages," she declared. "Last year, after careful pricing, the purchasing agent filled 8,551 requisitions. 66½% went to Quincy merchants. A supply department was set up carrying over 100 items, largely office supplies, standardized as to quality. The actual saving to the taxpayers ranged from 10 to 50%. Today if you want a thumb tack in City Hall, you must see John Lane, the purchasing agent.

"Everyone knows that one of the choicest playgrounds of local politicians is in supplying gas, oil, tires and accessories to public vehicles. Formerly only the highway department bought gas and oil in bulk. Today all gas is purchased at tank car prices and dispensed at the municipal garage. The saving of about five cents a gallon on 140,000 gallons is approximately the cost of running the purchasing department. Not only was there a saving of 15% on tires, but better still, the purchasing agent checks the number and mileage of every tire issued. There are none for the family car now."

Mader Heads Cleveland Manufacturing Firm

AL C. MADER, for the past several years purchasing agent of the Bishop & Babcock Mfg. Co., Cleveland, has been elected president of the Etched Metal Co. of that city, effective January 1st, and will direct an expanding program of operations. The company, which has experienced rapid growth, produces metal etched products from small name plates and tags up to large architectural panels, also etched stencils, signs and metal specialties. Mr. Mader has been an active member of the Cleveland Association of Purchasing Agents, and has been secretary-treasurer of that organization for some years past.

Inventories— High or Low?

(Continued from page 42)

reason why there is an element of greater conservatism today. Businessmen are waking up to the fact that the advance notice to the effect that this war is different contained considerable truth. Statistics show that sup-

MONEY CAN'T BUY A FINER ONION SKIN AT ITS PRICE!

FOR FINE QUALITY THAT IS ALWAYS UNIFORM, SPECIFY

PAVCO ONION SKIN

For uses where strength and durability are factors, such as Agreements, Leases, Reports and other important office and factory forms, you can always depend on PAVCO ONION SKIN. Its 75% rag-content insures maximum protection, and its moderate cost makes it an outstanding value. Remember the name — PAVCO — when next you specify a fine Thin Paper!

SAVE MONEY WITH THIS EFFICIENCY CHART—FREE TO EXECUTIVES!

Enables you to select at a glance the most economical grade of Thin Paper for any specific use. Fits under desk glass for ready reference. Write Dept. J today for your copy!

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Holyoke, Mass.
Makers Of Fine Papers Since 1866

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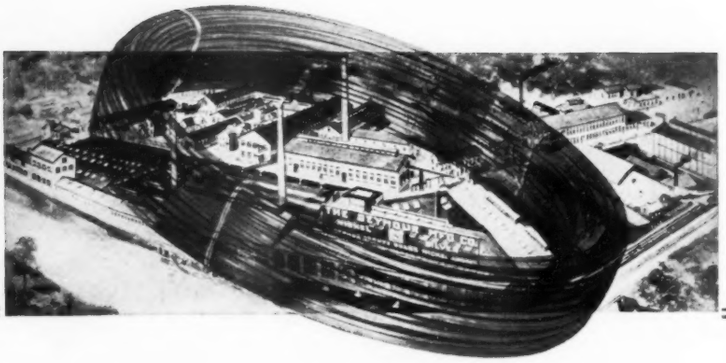

BACK OF EVERY COIL OF WIRE

THAT BEARS THIS NAME—

SEYMOUR

Back of every pound of Seymour Nickel Silver and Phosphor Bronze wire, rod and sheet—back of every Seymour Nickel Anode—stands the above factory, operating approximately 600 employes and covering 350,000 square feet of space.

To you as a Purchasing Agent, this means a reliable source of supply and a guarantee based on the solid substance of integrity.

THE SEYMOUR MFG. CO., 55 Franklin St., Seymour, Conn.

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GRINDING WHEELS

Regardless of your requirements, you can obtain a Dayton abrasive wheel of the exact specifications the work demands. On the market for years and the preference for a wide range of operations. Write

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FACTORIES AT: Dayton, Cleveland, Beloit, Buffalo

plies of raw materials and finished goods in European countries are materially above the volume noted in 1914. The British Empire is more self-sustaining than was the case twenty-five years ago. Competitive bidding on the part of belligerent countries has definitely been avoided, and England in particular has devised a plan of utilizing her colonies as a source of supply. The change in the Neutrality Act automatically restricts American shipping from the war zone, and it stands to reason that with thousands of dollars' worth of merchandise bought for foreign account resting on seaboard piers awaiting foreign ship bottoms, the outlook for any great stimulation in export trade in 1940 similar to the expansion noted back in 1915 and 1916 is not particularly reassuring. It is not difficult to conceive of a steady growth in exports in the event of a prolonged war involving several years, but it is a definite mistake to anticipate any immediate uncontrolled industrial boom or a return of pronounced inflationary characteristics during the near term based solely on a huge flow of goods from this country to the belligerent countries.

These facts are beginning to be definitely understood, and consequently, wholesalers and retailers are not going haywire and are apparently content to proceed on the basis of maintaining normal inventory reserves and no more. So as we enter 1940 it is our belief that the inventory situation all along the line is relatively sound. The problem as the year progresses simmers down to this—either ultimate consumption must expand further to levels that will support the higher rate of industrial activity, or else production schedules must be pared down in order to prevent stocks in the hands of primary producers and manufacturing industries from reaching burdensome levels.

The losses created by exorbitant inventories in 1929 and again in 1937 represent experiences that will not easily be forgotten. The inventory situation can, of course, in time become critical; but as matters now stand, supply-to-demand ratios from primary producers to the smallest retailer are not severely distorted.

For additional products see Buyer's Directory, page 108

Obituary

WILLIAM SHERMAN FRISBY, 74, a charter member of the Purchasing Agents Association of Chicago, died November 18th after a prolonged illness. Prior to his retirement from active business, Mr. Frisby was vice president of the Bishop Lumber Co., and president of the Chicago Retail Lumber Dealers' Association.

FRANK E. HOVORKA, 64, purchasing agent for the Dingle-Clark Co., Cleveland, up to the time of his retirement six months ago, died November 28th.

WALTER G. KANALEY, 40, purchasing agent for the Union Trust Co., Rochester, N. Y., died December 3rd.

MARSHALL A. SHUFF, 72, since 1917 purchasing agent for the Virginia Iron, Coal & Coke Co., Roanoke, died at his home in Pulaski, Va., December 5th, after a long illness. Mr. Shuff had been associated with the company and its predecessors for fifty-three years, and served as purchasing agent since 1917.

JOHN KNOX NIMOCK, 56, New York purchasing agent for the American Car & Foundry Co., died at his home in that city, December 7th, of a heart attack.

EDWARD C. HAKER, 64, purchasing agent for the Euclid (Ohio) Crane & Hoist Co., died at his home in Mentor, Ohio, December 9th, after a brief illness. He had been associated with the company for 32 years.

EARL S. ROE, 50, purchasing agent and secretary of J. M. Warren & Co., Troy, N. Y., died at his home in that city, December 13th. He had been associated with the company for 36 years.

JOHN J. DOOLEY, 60, purchasing agent for *The New York World-Telegram* up to the time of his retirement from active business in 1936, died at his home in Richmond Hill, N. Y., December 17th, after a brief illness.

DON P. O'KEEFE, 57, purchasing agent for the Chevrolet Division, General Motors Corp., died at Detroit, December 18th, after a long illness. Mr. O'Keefe had been with General Motors for 33 years. He became assistant purchasing agent for Buick in 1908, New York purchasing agent for Chevrolet in 1921, and was appointed head of the department when the main offices of the company were transferred to Detroit a few years later.

C. AUBREY HUSTON, for the past twenty years purchasing agent for the Federal Reserve Bank in Philadelphia, died December 18th.

JOHN ROCKEFELLER BOWMAN, 61, steel buyer for the General Electric Co., Schenectady, died of a heart attack at his home in Scotia, N. Y., December 18th. Mr. Bowman was associated with the purchasing department for 37 years.

CHARLES F. ENSWORTH, 72, purchasing agent and office manager of the Foster Machine Co., Westfield, Mass., died at his home in that city, December 22nd after a brief illness.

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RESEARCH - DESIGN - ENGINEERING

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Refiners and Makers of
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AMERICAN ABRASIVE COMPANY
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WILL CONVINCE YOU THAT
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IS A BETTER PENCIL!

Businessmen are always interested in "More for your money" . . . and Templar Pencils are just that! Made Right . . . Priced Right, They're Right for Every Writing Need

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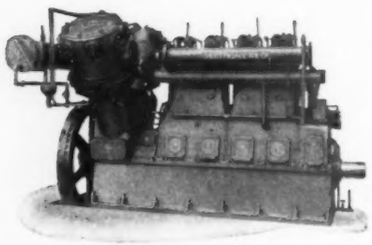
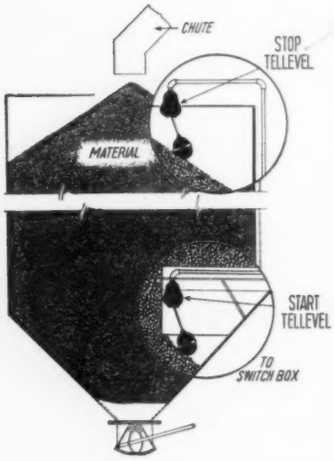
New PRODUCTS · IDEAS



STATIONARY COMPRESSOR

THE Chicago Pneumatic Tool Co. announces a new series of stationary compressor units, Class W-CO, consisting of a double acting water-cooled compressor on a common crankshaft and base with a heavy duty Diesel engine. Standard sizes are available in capacities of 662 to 2,000 cu. ft. per minute for pressures of 80 to 125 lbs. Simple, compact, and highly economical in operation, the units are ruggedly built for continuous heavy-duty service. They offer low set-up cost, being handled in one piece and requiring only a small and simple foundation; low maintenance expense, with pressure lubrication and all parts completely accessible; and low fuel consumption.



STORAGE CONTROL

DUST-TIGHT and explosion - proof, and with no wearing parts to cause trouble in operation, the Tellevel device of Stephens-Adamson Mfg. Co. provides an effective control for starting and stopping conveyors feeding bulk materials to bins or hoppers, and for opening and closing valves feeding liquids into tanks. Normally, operation is entirely automatic, but by a simple change in wiring it can be made to keep the flow of material stopped or continuous until the control switch is thrown. The device consists of a multiple electrode sealed mercury switch so mounted that tipping it in any direction will break the electric current. A polished aluminum bell provides the dust-tight housing for the switch and electric wiring.

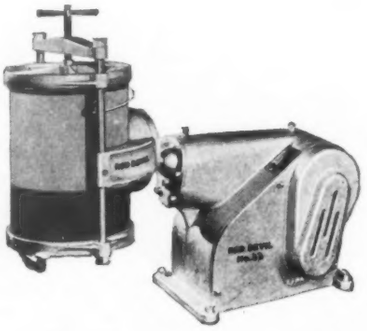
CRAWLER SHOVEL

AFTER more than a year of field tests as a shovel, dragline and crane on tough digging and handling jobs, the Link-Belt Speeder Corp., 307 N. Michigan Ave., Chicago, Ill., announces Series 300 crawler shovels, 1½ to 2 cubic yards capacity, equipped with Speed-O-Matic hydraulic (oil) power control, giving greater speed and ease of operation, resulting in notable increased output as compared with manual control. Safe and fool-proof control of travel, steering and locking brakes entirely from the operator's position in the cab. Ground clearance has been increased, 14½" to 18" clear, and the travel, steering and locking machinery is entirely enclosed, with no protruding housings or parts to obstruct travel or become damaged or fouled. Powered by Diesel, gasoline, oil or electric motor drive, and offered with a choice of crawler widths and lengths to suit any practical operating or ground condition.

OIL WINDOW

IMPROVED visibility of oil levels is provided by this self-contained unit developed by Bijur Lubricating Corp., Long Island City, N. Y., and adapted to general use with oil reservoirs, containers and lubricators, etc. The assembly consists of a chromium plated ring, with polished face pressed flush, a window, gasket, and cup, all fitted snugly into a metal pocket. Drilled openings at top and bottom of the cup permit free passage of the oil. The bright aluminum background of the cup acts as a reflector which gives sharp visibility of the oil level, even with imperfect lighting. There are three standard window sizes—¾", 11/16", and 15/16". The whole assembly can be conveniently installed in a simple bored opening, readily provided in the design of a machine casting or part. A special assembly tool is available for tapping the ring accurately and securely into place without risk of breaking or marring the window.

PAINT CONDITIONER



TO secure a proper working mixture and restore freshness to paint and similar materials requiring severe agitation, Landon P. Smith, Inc., Irvington, N. J., offers to manufacturers, industrial users, building maintenance operators, municipalities, etc., the new "Red Devil" electric paint conditioner illustrated above. Compact, durable and efficient, it will handle 5-gallon, 3-

gallon or 2-gallon cans, featuring a three-way action—outward, upward and downward—creating a high-speed agitation within the can, tearing the pigments apart, disintegrating side-wall sediment, and thoroughly mixing them with the vehicle. In addition, the can-holder is readily adjustable to three different positions—upright, sidewise, and upside down. The 1/3 h.p. motor is completely enclosed but easy to get at. All other mechanism operates in a bath of oil, and requires no attention except a glance at the oil gauge. It is shipped completely assembled, with lag screws for fastening to the floor through rubber shock absorbers. Other models will handle containers from ¼-pint to 1 gallon.

CORROSION RESISTING SCALE

TRINER Sales Co., 1441 Merchandise Mart, Chicago, Ill., announces a new model scale resistant to the action of salt and brine. The frame, levers, platform, in fact every part down to the smallest nut and screw are made of either stainless steel or monel metal. Another model is available, furnished with all stainless steel parts, in place of the monel metal, and giving added resistance to acids and fumes as well as salt. The illustration shows platform raised to show construction, with special shields, overlapping flanges, cups, drains and seals provided to decrease the likelihood of moisture, materials, and cleaning compounds finding their way into the working parts. The dial has a double-clear glass window, sealed with air lock, and resists fogging. For permanent accuracy under conditions of excessive humidity or corrosive vapors, the scale offers exceptional value, prolonging the life of the equipment, eliminating rapid deterioration, high maintenance costs and frequent depreciation. It incorporates all the precision features of other Triner models.

GRINDER SHIELD

BETTER visibility and effective protection of the eyes and face from flying particles is provided by the new Marvel grinder shield developed by The Boyer - Campbell Co., Detroit, Mich. The frame is of molded, high impact resisting, plastic material, with electrical parts in a completely insulated chamber that eliminates the hazards of shorts, all mounted on a completely adjustable cadmium plated bracket designed to harmonize with modern machine tool equipment. The window is of non-shatterable glass, and the bayonet-type lamps are vibration resisting, set in flush with the frame, focusing the light directly on the work and not mirrored into the eye. Magnifying lenses of any focal length are also available for working to close limits and in inspection work, a glass coverplate protecting the lens from pitting. All parts are completely interchangeable.

Speed Assemblies in 1940

with TRIPLEX Quality

Cap Screws, Bolts and Nuts

When you figure close on speedy efficient assembly for reduced costs and better profits, TRIPLEX Products help you succeed. TRIPLEX Quality is maintained through exacting steel specifications, strictly supervised production, careful inspection. Accurate deep threads, clean-cut points, properly formed heads—whatever correct bolt and screw practice calls for is rigidly observed.

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CAP AND SET SCREWS, BOLTS, NUTS AND RIVETS
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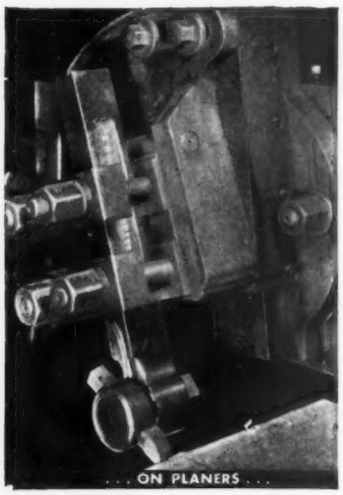
ARMSTRONG



Step up your Tool Room schedule with more . . .
ARMSTRONG TOOL HOLDERS

- The best solution for a jammed-up tool room is More ARMSTRONG TOOL HOLDERS. With the right tool holders for every operation you can step up machine tool speeds and feeds far beyond the "standards" set in the old bar tool days.
- The Armstrong System provides tool holders for every operation on lathes, planers, slotters and shapers—over 100 different sizes and shapes each correct in design and proportion, correct in cutting angle and tool approach; each the most efficient tool available for its particular work painstakingly worked out to give maximum rigidity with maximum clearance. Because ARMSTRONG TOOL HOLDERS are strong beyond need, handy and multi-purpose, there is a tendency in many shops to use a few tool holders for all types of work. This is false economy for the maximum efficiency can only be had with the correct type and correct size ARMSTRONG TOOL HOLDER for each operation—and for each machine tool.
- If you want to break the jam in your tool room, to turn out the same work in fewer machine hours, check the tool holders on lathes, planers, slotters and shapers against the new C-39 Catalog. Then, when properly tooled step-up speed and feeds.

Buy ARMSTRONG TOOLS from your Supply House

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"The Tool Holder People"
303 N. Francisco Ave., Chicago, U. S. A.
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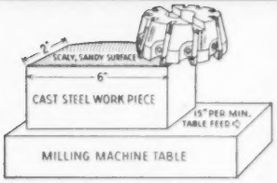
The Bright Spot
IN MILLING SCALY STEEL CASTINGS



Cutter used on above job was a 5 in. diam., ten blade, McCrosky Jack-Lock Milling Cutter, similar to their twelve blade cutter illustrated at right. Photo

KENNAMETAL

MILLS 15 TO 30 TIMES MORE PIECES IN 1/6 THE TIME PER PIECE

When you purchase KENNAMETAL-tipped tools you can be assured of a high return on tool investment over a long period of time. KENNAMETAL not only permits greatly increased production but also has marked resistance to breakage—consequently, longer tool life. The above tests were made on scaly, sandy, hard castings, yet there was no damage to the KENNAMETAL-tipped blades—an unusually severe test for a hard carbide tool material.

TYPE OF BLADE	PIECES PER GRIND	MILLING TIME PER PIECE
KENNAMETAL-tipped	300	Less than ½ min.
High Speed Steel	10 to 20	3 min.

Note to Safety-Minded Purchasing Agents

Because of its superior strength, chip breakers may be ground on KENNAMETAL without seriously weakening the tip—enabling your machine shop to dispose of long, unbroken steel chips safely . . . quickly . . . economically. Whether used to tip single point cutting tools or special tools such as milling cutters, KENNAMETAL will speed up production—produce more accurate work. Write for complete information today.

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LATROBE, PENNSYLVANIA, U.S.A.

UNIT CONTAINERS

COMPACT and flexible storage for small parts, completely accessible for use at a bench or in assembly work, is made possible by the unit containers illustrated, manufactured by The Gordon L. Hall Co., Old Lyme, Conn. Racks are provided in two styles to accommodate seven sizes of standard and hopper bins ranging in capacity from ½-pint to 6 pints. The bins are interchangeable, and the stacking rack-units can be arranged to suit working or storage conditions. Ruggedly constructed, the design makes for convenience as the sloping position keeps parts toward the front of each bin. Label holders are also provided.

LOCK-NUT

THE Elastic Stop Nut Corp., Elizabeth, N. J., has expanded its line by introducing nine new types of nuts embodying the basic Elastic Stop self-locking element — a resilient non-metallic collar built into the head of the nut. In resisting the entrance of the bolt or screw, this collar forces the thread faces into a pressure contact which is maintained after the nut is tightened. With thread play thus eliminated, the nut can not work loose under vibration, operating stresses, or wear of surrounding parts. The new types of nuts are designated as thin hexagonal, spline, internal wrenching, countersunk and counterbored one-lug anchor, countersunk and counterbored two-lug anchor, countersunk corner anchor, bracket anchor, floating right angle anchor, and floating basket anchor. With variations in sizes, thread systems and materials, this represents the addition of 160 new standard items.

CASHIER'S CHAIR

EQUIPPED with a heavy steel, triple-locked safety deposit box, unobtrusively located under the seat, and with special channels anchoring the chair permanently to the floor to prevent removal, this new cashier's chair of the Royal Metal Mfg. Co., 175 N. Michigan Ave., Chicago, Ill., provides excellent protection against attempted hold-ups.There is a slot permitting the cashier to slip currency into the box easily; two keys are required to open it—one for the cashier and the other for the manager or collector. The chair is comfortable, with spring construction, and slides in the channels to permit adjustment to the proper working position. The frame is chrome plated, seat and back upholstered in leatherette of any color.

REVERSIBLE RATCHET

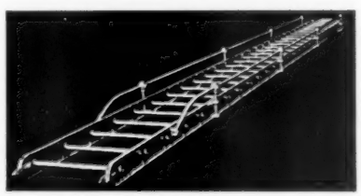
A NEW miniature reversible ratchet is announced by Armstrong Bros. Tool Co., 303 N. Francisco Ave., Chicago, Ill., together with four new drivers for their line of detachable head wrenches. The reversible ratchet is only 4 in. long, machined from special chrome

For additional products see Buyer's Directory, page 108

vanadium steel and finished in chrome plate. The ratchet has hardened gear and instant reversing thumb switch. The other items consist of a flexible head handle, a screw driven type extension spin-grip which permits locking the head so that it can be used as a spinning extension, and long and short extensions.

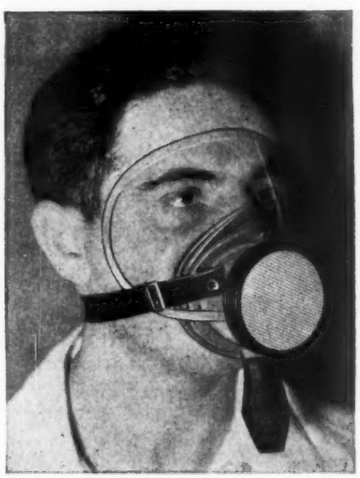
PHOTO-ELECTRIC RELAY

THE Westinghouse Electric & Mfg. Co., East Pittsburgh, Penna., has just announced a new compact photoelectric relay adapted for use in counting, sorting, weighing, measuring, signalling and similar functions. Designed for low initial cost, ease of installation, and low operating expense, this type RQ Photo-Troller may be connected easily to any 115-volt a.c. line. It has two normally open and two normally closed contacts, each rated at 10 amperes. It operates on a light change of 40 foot-candles, if not more than 15 foot-candles of extraneous light is present. Increased sensitivity is obtainable by means of a condensing lens. The unit may be wall or bench mounted, with open wiring or with concealed or exposed conduit. It has a gray die-cast chassis, with a block molded cover which is removable without tools.



ALUMINUM LADDER

ESPECIALLY designed for use in connection with the storage of materials and maintenance work in industrial plants is the new Type 800 ladder announced by the Aluminum Ladder Co., 150 Adams St., Tarentum, Pa. The rungs are corrugated to prevent slipping, there are handrails on each side, and steel or aluminum spikes on the bottom. The aluminum spikes are recommended for use around oil tanks and other places where inflammable materials are being handled. as these spikes do not throw a spark. The ladder is furnished in various widths, and in lengths up to 36 feet. Being made of aluminum, it can not rust, rot, splinter or burn, and its light weight makes it readily portable from one part of the plant to another as required.



EYESHIELD RESPIRATOR

A NEW eyeshield-respirator developed by the Pulmosan Safety Equipment Corp., Johnson & Prince Sts., Brooklyn, N. Y., combines the eye protection of a plastic eyeshield with the breathing protection of a respirator, and is particularly adapted to workers in conditions of dusts, splashing or flying particles. The eyeshield is of clear plastic, weighing only ½-ounce. It is arched over the respirator and held in place by means of the headband snaps, affording unobstructed vision and snug, comfortable protection without undue pressure points on the face. The construction is such as to prevent flapping, bending or

MEMO
FROM OFFICE OF WORKS MANAGER

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Understand this material is superior to jute, burlap and other similar imported materials. That it does a much better wrapping, packaging or bagging job because of unusual strength, pliability, water and dust-proof qualities. Suggest getting a sample of it and testing for our products.

WHATEVER you make — whatever you ship — check the many advantages of Fibreen for better wrapping, packaging or bagging. Low-cost Fibreen seals your shipments against moisture and condensation —keeps out dust and dirt—prevents concealed damage—has clean, kraft surfaces . . . is easy to apply.

Furthermore, Fibreen is quickly available, involves no price troubles or uncertain deliveries.

FIBREEN
• REENFORCED
• WATER and DUST PROOF
• UNBELIEVABLY STRONG

Send for a liberal sample of Fibreen for any trial or testing in any use you have in mind.

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New York San Francisco London Sydney

Serving Industry and Building with Reenforced Papers, Metals, etc., for Multiple Uses and as Part of Finished Products

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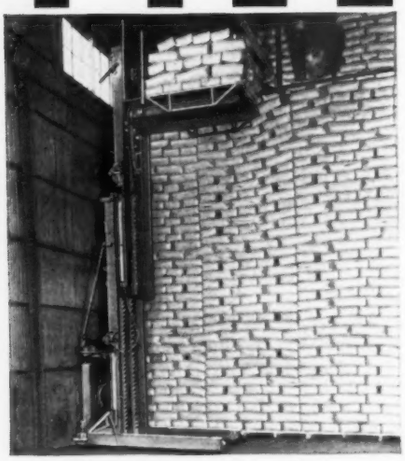
PILE HIGH



to lower storage costs!

Barrett Portable Elevators—hand or electric—solve many storage problems. With them you get the most from your floor space by piling boxes, barrels, bags, bales, crates or rolls many tiers high. And they save on plant maintenance work. Models for handling dies and loading trucks from floor level; also stationary inter-floor, turntable and telescoping types.

There's a Barrett Portable Elevator for every requirement of industry. Write for Portable Elevator Catalog showing application in many types of plants.

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Barrett Handling Equipment

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• PYOTT saves you PATTERN COST on Round Castings

Pyott has developed a system of using flexible stock patterns with which practically any round casting in semi-steel or grey iron can be reproduced accurately, economically and in less time. Casting diameters range: 2" to 144" inclusive—any weight—any thickness. Send rough sketch with *accurate* dimensions for quotation. Satisfaction guaranteed. Let Pyott also quote you on semi-steel or grey iron castings made from your own patterns. Castings delivered finished or semi-finished as you prefer.

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DISCS
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GLANDS
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MAKE PYOTT HEADQUARTERS FOR

GEARS FLYWHEELS

FOUNDRY WORK SHEAVES

PYOTT FOUNDRY & MACHINE CO.

328-32 N. SANGAMON ST., CHICAGO

twisting. It is easily removed for cleaning and is available in assembly with varied models of respirators to suit conditions of use.

BEDSIDE TABLE

ORIGINALLY designed for hospital use, the Hi-Lo Tilt Table produced by the Hollin Co., Detroit, Mich., has found wide acceptance as a convenient portable table for office, home and study, for typing, writing, drawing or other uses. It is completely adjustable to any height from 24" to 43", and may be used flat or tilted and locked at any angle. The table top measures 24 x 15 inches. A metal book ledge is attachable to either side, providing for right or left hand use. Supporting members are of heavy tubing, with a lasting chrome finish.

PORTABLE DRAWING TABLE

FOLDING and unfolding like a camp stool, this portable drawing table can be lifted easily with one hand and is readily set up for use anywhere. The drawing board is of pine, 20 x 26 inches, permanently attached to a hardwood supporting frame. A finger touch locks the board at the desired position, and it stands firmly in place, providing a solid and steady working surface. There is ample knee room, and a pencil and instrument rack across the top. Manufactured by the Eugene Dietzgen Co., Chicago, Ill.

LIGHT DUTY ELECTRIC DRILL

THE new Thor Drill Champion, developed by Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill., is of ½" capacity, designed for intermittent service in automotive, electrical, plumbing and similar installation and maintenance work. It can be used for drilling in both wood and metal. Weighing only 9¼ lbs., and measuring only 15¼" overall, it is streamlined for effective use in hard-to-reach places. It has a powerful motor and extra heavy tooth pitch gears for transmitting power to the chuck, also extra large air intake to keep the motor cool. Oil-lite bearings are used throughout except on the spindle, which has ball bearings. Standard equipment includes double pole momentary switch fully enclosed in dust-proof compartment, a spade handle and removable dead handle.

For additional products see Buyer's Directory, page 108

MEMO TO

Mr. P. A.

ROPER will send you (UPON REQUEST) a valuable booklet on pumps for your reference file...

Contents:

CHARTS AND TABLES ON:

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- Instructions on Installation
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- Cylinder Displacement
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8 MONTHS' service

GARLOCK 234 *Rotopac* Packing gives eight months' service on these 6-stage boiler feed pumps operating at 1800 R.P.M. and delivering 100 G.P.M. at 425 lbs. pressure, 230°F. Use GARLOCK 234 on all your rotary or centrifugal pumps handling hot water, cold water, caustic solutions or weak acids—for long, dependable service. All sizes from ⅛" to 1¼".

THE GARLOCK PACKING CO.
PALMYRA, NEW YORK

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Coil—GARLOCK 234
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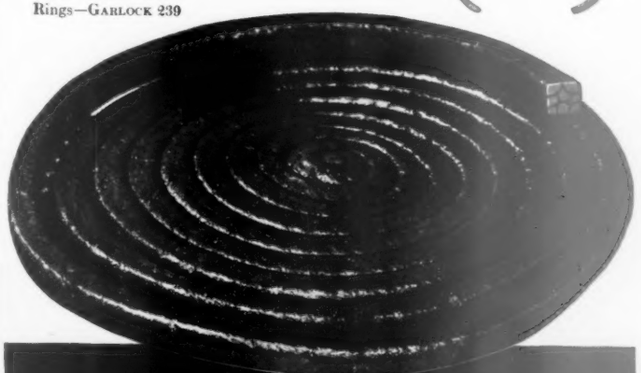

GARLOCK 234

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IDEAL

Losses from theft of tools and parts can run into *real* money! You can eliminate such losses and prevent mistakes in use of materials, parts, tools, dies, etc., with an *Ideal* Electric Marking Tool.

IDEAL ELECTRIC MARKER

Marks practically *any* kind of material, including glass, ceramics, metals, bakelite, tile, etc. Long after other kinds of identification are detroyed, the cutting marks of this tool remain clear and legible!

IDEAL ELECTRIC ETCHERS

Engrave any desired markings on SMOOTH SURFACED iron and steel and their alloys. Available in both "STANDARD" and "HEAVY DUTY" models.

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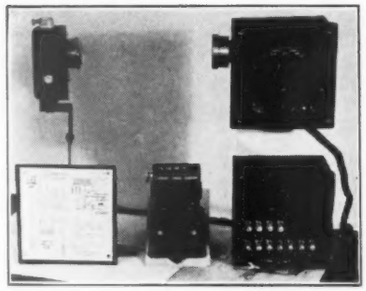
PHOTO-ELECTRIC COUNTER



SUCCESSFULLY used in steel and paper companies, and adaptable to many other industrial counting applications is the PC-3 equipment developed by Lipman Engineering Co., 415 Van Braam St., Pittsburgh, Pa. The photo-electric unit is rugged yet sensitive, built particularly to require a minimum of maintenance. The impulse actuates a magnetic counter, which can be operated any distance from the photo relay. The moving parts of the counter are hardened steel and bronze forgings, all working parts enclosed. Bakelite number wheels are used, providing a minimum of inertia and wear. There are two models having respectively: six wheels, with figure size ⅛" x ¼"; and four wheels, with figure size ¼" x ¼". One complete turn of the reset knob will return all wheels to 0.

New Industrial Materials

(Continued from page 46)

made to put on a welded deposit and then roll. A notable improved composite plate is one recently produced by Babcock and Wilcox by resistance welding of the sheets. A thin sheet of nickel is placed between the stainless steel and the steel baseplate. This nickel not only aids in producing a completely bonded surface, but it also prevents migration of the carbon from the baseplate in the welding operation.

Conservation of materials is important, and it is well known that about 30% of the total steel that goes into a machine shop comes out again as scrap. Timken is now featuring a "mechanical tubing," consisting of uniform seamless steel tubes for direct manufacture into bushings, lock nuts, pinions, gears, spindles, etc., in order to cut down the amount of machining and save more than enough scrap to pay the extra cost of ordering to size.

Along this same line, the mills can now work to such close tolerances that in many lines it pays to figure on a higher first cost and save labor, time and money in manufacture. This is a trend that should be watched. Mills do not like to run off small lots of specials, so it has to be started back with the designers to stick to standards.

Rapid Progress in Plastics

The field of synthetic plastics has become a new world of science in itself. The latest census (1937) showed an increase of 55% in two years and 200% increase in four years. The latest group of acrylic resins is now available from soft sticky semi-liquids to hard and tough solids. They are suitable for adhesives, protective coatings, leather finishes, laminated glass, and molded products. Methyl methacrylate is a hard rigid resin of this group, superior to glass in the transmission of ultra-violet light, and more stable to light than the plastics formerly used for safety glass. It does away with the cloudiness of windshields, and is a valuable new aircraft glass material.

This year saw much publicity given to the use of plastics in airplanes. But engineers say that

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An SKF Red Seal Bearing

THIS BEARING IS AIR-CONDITIONED!

. . . BECAUSE the Certified Felt seal "breathes"; that is, it allows the air inside the bearing to pass out when it becomes heated and consequently expands; and also, when the bearing has cooled, the felt seal allows air to enter, excluding any dust or particles in the air which would be injurious to the life of the bearing.

This "air conditioning", and, at the same time effectively sealing a bearing, with Certified Felt seals assures one of maximum bearing performance.

Our research laboratory is at your disposal for whatever problems, new or old, you may have arising from the use of felt in the mechanical field. If you have a problem of sealing, consult our engineers.

• • • •

THE FELTERS COMPANY, INCORPORATED
210 South Street, Dept. B-1 Boston, Massachusetts
Offices in Principal Cities

● Forged from hard aluminum alloy with double-handled grips, this heavy-duty hack saw frame is designed to hold blades at machine tensions, saw accurately and easily without sticking, and give a mechanic the feel of a fine tool for doing his best work. A MARVEL hack saw fitted with MARVEL blades is the best hand equipment you can buy. MARVEL saws and blades are made only by:

●

ARMSTRONG - BLUM MFG. CO.
"The Hack Saw People"
5760 Bloomingdale Ave., Chicago, U. S. A.
Eastern Warehouse and Sales: 199 Lafayette St., New York

Kimpak

REG. U.S. PAT. OFF. & FOREIGN COUNTRIES

CREPE WADDING

protects your product
dresses your package

Showing how Charles A. Stevens & Co., Chicago, uses **KIMPAK** *in a typical gift packing to protect beautiful Sevres vases against shipping damage.*

● KIMPAK* is the ideal packing material—inexpensive, light-weight, flexible, it can be applied quickly and easily without fuss, muss or waste. Your product, be it big or small, protected by KIMPAK, travels in a safety-cushion of soft, yet resilient material that helps to guard against finish or structural damage to its original "factory-fresh" condition. What's more, KIMPAK takes a vigorous part in stimulating sales by dressing up your package and giving it added beauty and distinction.

KIMPAK is manufactured by the Kimberly-Clark Corporation to the highest standards of quality and uniformity, and may be had in rolls, sheets and pads of wanted thicknesses and sizes. Our engineers will gladly assist in solving your packaging problem.

* *Reg. U. S. and Canada Pat. Off.*

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Attention of _____ *Our Product is* _____

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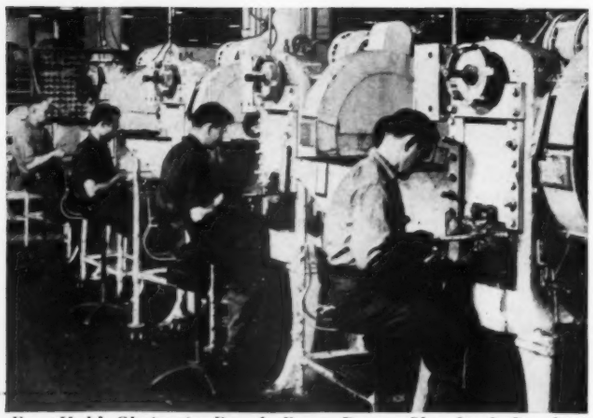
This is a shipping room foreman getting a good night's rest. Why? Because he uses Red Streak Sealing Tape! We'll wager that your shipping room would also appreciate a sealing tape that takes the "rap" out of wrapping. Red Streak, composed of No. 1 Kraft and an ample coating of quick setting glue, lets your shipping room meet all schedules. Write today for samples.

The BROWN-BRIDGE MILLS Inc.
TROY, OHIO

RED STREAK
SEALING TAPES



Ever-Hold Chairs in Punch Press Dept., Cleveland Graphite Bronze Co., Cleveland, Ohio

Every Worker Seated at—"Height that's Right"

If you are considering the purchase of new chairs for workers in office or plant, be sure to get this 3rd Comfort feature without extra cost. Height instantly and automatically adjustable to any worker.

EVER-HOLD TRADE MARK Automatic Adjustable Stools and Chairs

—end tiring strain—result in more and better work. Just lift seat to height wanted. No thumbscrews, no gadgets, no tools needed. Write for Special Folder, prices and discounts.

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Leaders in the Manufacture of Laboratory and Library Furniture Since 1905.

plastics at present as construction materials can be used for insulation, panelling, glass, and decorative parts, but not much more. Ford experimented with plastic fenders, but advantages do not seem to outweigh disadvantages. The cost of dies for molding is one of the deterrents against the use of plastics for low-quantity production. Two recent developments are helping to lick this problem. One is beryllium-bronze cast dies, and the other is electrolytically-deposited iron dies. This latter is essentially a plating process except that deposits as heavy as 0.5 in. can be built up around carbon-coated forms.

Probably the outstanding development of the year in the fabrication of plastics is the production of molded articles lighter than water and nailable. This is done by new fabricating and compounding processes rather than by new resins. It is understood that the development is completely covered by patents, and has not yet been released commercially. The compounding of synthetic resins to form plastic articles and solutions of new properties is progressing rapidly.

Better Production Methods

Great increase in aircraft production has called for new ingenuity in overcoming the expense of forming-die demands, since the relatively small lots of any one sheet-metal part does not permit costly dies. An old process of rubber punches has been revived and improved. Wooden dies, or simple cast zinc or lead dies are used with heavy rubber pads (up to 9 in. thick) as the punch. They are serving well to form sheet aluminum parts.

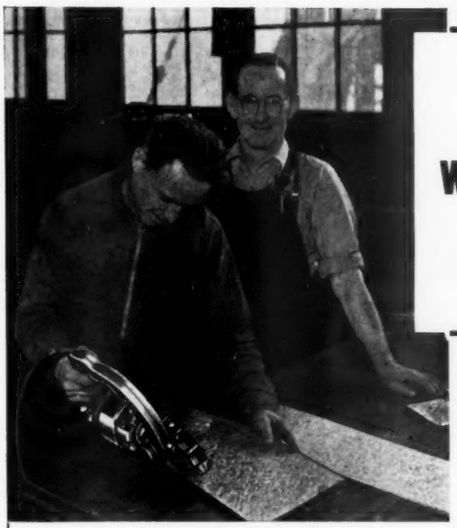
Little over ten years ago tungsten carbide was introduced from Germany as a cutting tool material, and caused complete redesign of many machine tools to take the heavier and faster cuts. American producers later brought out tantalum carbide, and now there has been put on the market a combination material containing a double carbide. Kennametal, of the McKenna Metals Company, contains crystals of $WTiC_2$. It is claimed to give a fine-grained, dense, strong tool that will cut 12% manganese steel at 100 ft. per min. The makers of Carboloy, pioneers in tungsten carbide, are now also featuring a new cutting material containing tungsten, titanium, and tantalum carbides.

Replacing Strategic Materials

Leather is another strategic material that is a growing cause of concern. Lately sheepskins have been arriving from New Zealand that are hard and mold-covered, showing long storage weaknesses. This has revived the old question of synthetic leather, and it is known that at least two important laboratories have gone into the problem in serious fashion. Ford and several others previously tackled synthetic leathers with little success. Coated fabrics as substitutes for leather serve as covering materials, but cannot be used to replace leather in the leather-goods industries. What is wanted is a felted fibrous material, that would be more uniform than leather.

Only a small part of the hide can now be used for the best grade leather articles, and since leather varies with the condition of the animal and the age of the hide, even selected parts of the skins are not comparable in uniformity. Three

For additional products see Buyer's Directory, page 108



How Much Can YOUR Plant SAVE With The Purchase of A STANLEY UNISHEAR?

"MIGHTY MIDGET" Unishear costs only $54.00, cuts any sheet material up to 18 ga. hot rolled steel. Follows any pattern. No distortion of metal. Portable, weighs only 7 pounds, plugs in any light socket. Pivoted Duplex handle, two grips for any position.

DEMONSTRATION on the right model Unishear for your work will be gladly arranged by a Stanley distributor, or write for literature. Stanley Electric Tool Div., The Stanley Works, 156 Elm Street, New Britain, Connecticut.

SAVE on the built-in dependability of a Unishear or any other Stanley Electric Tool, like this user above, who reports, "My son and our Stanley Unishear started work together 10 years ago. Since 1929 our Unishear has saved us hundreds of dollars on all kinds of operations."

SAVE on this tool's usefulness – it cuts any sheet material any pattern, as fast as you feed. Handy to use as a pair of snips. Shown above removing section of 18 ga. stainless steel for sink; cuts time on operation 70%, permits $1.60 salvage on each cut, leaves clean, smooth, undistorted edges.

A Complete Line For Industry **STANLEY** STANLEY **ELECTRIC TOOLS** *"Cost Less Per Year"*

HELPS KEEP THEIR COSTS LOW

Because he so effectively helps many purchasing executives in one Eastern city keep their cleaning costs consistently low, this Oakite Service Representative is welcome whenever he calls.

His thirteen years' experience and specialized knowledge enable him to suggest time-tested methods and ideas that invariably lead to the improved, low-cost cleaning results these concerns want.

Near you is another capable Oakite Representative who can be of definite help on your cleaning problems. Write to have him call ... get his money-saving suggestions now. No obligation.

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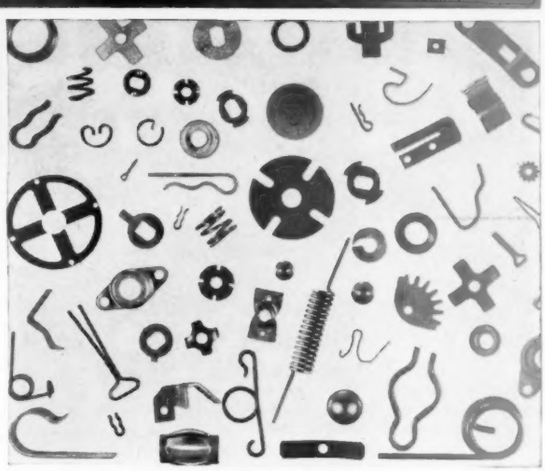
Representatives in All Principal Cities of the U. S.

OAKITE *Certified* **CLEANING**
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

SPRINGS STAMPINGS WIRE FORMS



. . . in any material, any quantity. Modern tooling and production equipment. Heat treating. Spot welded and tapped assemblies.

Write us about parts like these; send your drawings or samples for quotations. Ask for stock lists; smooth cut washers, all types of spring washers, cotters, expansion plugs.

M. D. HUBBARD, Pres. P. M. HUBBARD J. A. HUBBARD, Secy.

M. D. Hubbard Spring Company
275 CENTRAL AVE., PONTIAC, MICH.

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Yep . . . you sure can
cut your wrench expense
with this Guaranteed
RIDGID
UNCONDITIONAL GUARANTEE
If this Housing ever Breaks or Distorts we will replace it Free.
THE RIDGE TOOL CO.
ELYRIA, O.

MILLIONS of users have learned how that housing guarantee adds to the life of a wrench, keeps it at work, stops time-out for repairs, cuts your investment in spare parts. You get the same expense-saving with this modern all-alloy wrench, with replaceable safe chrome-molybdenum jaws that grip and let-go instantly. You actually enjoy the adjusting nut that spins easily in all sizes, 6" to 60" —and the comfort-grip I-beam handle. And mind you, it costs no more than other top grade wrenches it far outworks. Save money—buy RIDGIDs at your Supply House . . . *today!*

THE RIDGE TOOL CO. • ELYRIA, OHIO

RIDGID PIPE TOOLS

Water Softener for a Million "Saturday Nights"

Signode Anchor Strapping as adopted by one of the Nations largest water softener manufacturers*.

Rides to Market with SIGNODE

● In contrast to the small, nonrecurring savings on the average run of individual purchases, Signode offers an opportunity for the kind of constructive purchasing every P. A. shoots at. Standardizing, for example, on Signode Anchor Strapping for car doorways, means continuous savings in bracing materials and in loading time on every carload of goods shipped. Above all, it means a steady gain in customer satisfaction as goods consistently arrive in A-1, damage-free condition.

The Signode System of car door bracing is applicable to such a wide variety of packaged products that we urge you to get the full facts about it. Write us direct, or phone the nearest of our offices, for complete information.

**Name on request.*

Ask Us About Signode Strap Cutter for Quick, Easy Opening of Incoming Steel Strapped Shipments.

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problems are involved, namely, selection of the right fiber, mechanical interweaving of the fibers, and a suitable binding adhesive for the fibers. Sisal fibers and wool have been used. A protein fiber is desirable, but the synthetic proteins are expensive. Synthetic leathers so far made with rubber binders have not approached true leather in characteristics. At present all that can be said is that synthetic leather is on its way, but its attainment may be years off.

Metallized wood is a new thing, hardly yet commercial. The process is based on a British patent and simple. The wooden article is immersed in a closed bath of fusible alloy having a melting point below the scorching point of wood, and air pressure is applied to the closed container. The impregnated wood is harder, heavier, has greater compressive strength, greater resistance to flexure, and becomes an electrical conductor lengthwise of the grain. Metallized wood is expensive, but has uses where these characteristics are desired in a nailable wooden article.

Imported waxes, especially carnauba, have been a worry to purchasing agents ever since the war scare. Germany has made itself independent with synthetic waxes, and the IG waxes are claimed to serve every purpose of carnauba and have some advantages. American tests seem to justify these claims, but the German source has now been cut off. American chemical plants, however, are undertaking the manufacture of the IG type of synthetic, and there should be little cause for concern.

The latest in magnesium castings is the use of high pressure in die casting, up to 10,000 lb. per sq. in., giving a sounder casting. Magnesium castings containing zinc, previously used in Europe, are coming into extensive use in this country. They are resistant to salt-water corrosion.

In every field of materials the research laboratories are very active. Some of them are deliberately searching for substitutes for the strategic materials, not, however, merely for *ersatz* materials, but for better articles. Little is being left to chance. Definite problems are being put up to the commercial laboratories with appropriations for extended search for improvements and new materials for specific uses. With continuing war conditions in Europe there is likely to be a slowing down of European invention, which will place America far in the lead in all lines of materials production.

CEL-U-DEX
Loose-Leaf Sheet
PROTECTORS
PAT. PENDING

• TRANSPARENT • FLEXIBLE
• REINFORCED EYELETS
• WATER PROOF

CEL-U-DEX CORP. 1 MAIN ST. BROOKLYN N.Y.

Uses: Salesmen's Kits, Advertising and Sales Presentation. Catalogs, Stamp Collections, Photos—Albums, Records.
KEEP SHEETS SPOTLESSLY CLEAN
Send for Samples and give name of your Stationer

For additional products see Buyer's Directory, page 108

2279 WAREHOUSE POINTS

• EACH PIN in this map represents a warehouse from which your order for Texaco products is delivered directly to your receiving platform. This means, for you, less inventories, quick deliveries. Phone the nearest of these 2279 warehouses, or write The Texas Company, 135 East 42nd St., New York, N.Y.

TEXACO
REG. T. M.

More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

Texaco Dealers invite you to tune in The Texaco Star Theatre—a full hour of all-star entertainment — Every Wednesday Night — Columbia Network—9:00 E.S.T., 8:00 C.S.T., 7:00 M.S.T., 6:00 P.S.T.

TEXACO Fuel and Lubricants

For additional products see Buyer's Directory, page 107

Yours ON REQUEST

• New catalogs and bulletins to keep the purchaser informed on industrial products.

33– CONVEYORS AND FEEDERS—The vibrating conveyors and feeders manufactured by the Ajax Flexible Coupling Company, make possible new and unusual efficiency in industry. They offer many advantages in handling bulk materials under exacting conditions. They are available in standard sizes and capacities covering a wide range of applications based on tonnage requirements and type of materials to be handled.

34– CIRCUIT BREAKERS—The moderate capacity switchboard type oil circuit breakers with all three poles in one tank, product of Allis-Chalmers Manufacturing Co., is described in their leaflet B6023. It is capable of wide application to central station and industrial service where economy and space are important factors.

35– ALUMINUM CONVEYORS—Aluminum portable gravity conveyors can be used wherever a conveyor is needed that can be readily moved from one location to another. This is an economical method of handling merchandise. The use of aluminum not only enhances the appearance of these conveyors, but greatly reduces the weight without sacrificing strength and durability. Ask for booklet on these conveyors manufactured by the Aluminum Ladder Company.

36– MOTOR PULLEYS— The sprucolite motor pulleys, manufactured by The American Pulley Co., are made from a dense, tough resilient material. They will withstand severe service and will maintain their diameters and crowns longer than any other stock composition pulley. They have a high-gripping power and are true running.

37– STEAM TRAP— A catalog and educational handbook on condensate drainage is announced by Armstrong Machine Works. Included in handbook material are rates of condensation, heat transfer, pipe sizes, piping layouts, maintenance, etc. Equipment covered by specific recommendations are unit heaters, jacketed kettles, syphon drained cylinders, water heaters, pipe coils, steam mains and steam purifiers. Complete information on sizes, capacities, prices, etc., are contained.

38– SHOP EQUIPMENT—Complete information on Atlas Press Company machine tools and equipment is contained in catalog No. 40. Interesting pages of operation close-ups, shop views, new and helpful machinery facts are incorporated therein. Several new attachments and accessories are announced along with design improvements in lathes, drill presses, arbor presses and shapers.

39– WOVEN WIRE BELTS— A 44-page catalog entitled "Audubon Metalwove Belts," released by Audubon Wire Cloth Corporation, shows numerous types of conveyor and processing belts which can be obtained in any ductile metal most resistant to various operating conditions, i.e., flame, high temperatures up to 2100° F., sub-zero temperatures, corrosion, contamination, abrasion, impact, etc. These belts have the longitudinal flexibility of leather, canvas or rubber, thus they can successfully run over small diameter pulleys and take acute reverse bends.

40– PORTABLE ELECTRIC TOOLS—The entire line of the portable electric tools manufactured by the Black & Decker Mfg. Co., is completely covered in a comprehensive catalog. Particular attention is called to two greatly improved drills, the ¼" Junior and the ½" Junior. Specifications and prices are included.

41– WASHROOM EQUIPMENT—Management recognizes the importance of modern washroom equipment. Bradley Washfountain Co. equipment is modern, sanitary, economical and durable. Send for bulletin showing their various products and typical installations, also blueprints booklet of washroom layouts. Let them solve your washroom problems.

42– DRAINERS—The wide selection of materials used in construction of the Cochrane Corporation multiport drainer meets specifications for efficient service at various pressures in power plants, paper, textile, food and process plants, and wherever large steam using equipment must be utilized at maximum effi-

PURCHASING, 205 East 42nd St., New York, N. Y.

I wish to receive the following literature:

Numbers: .....

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Name .....

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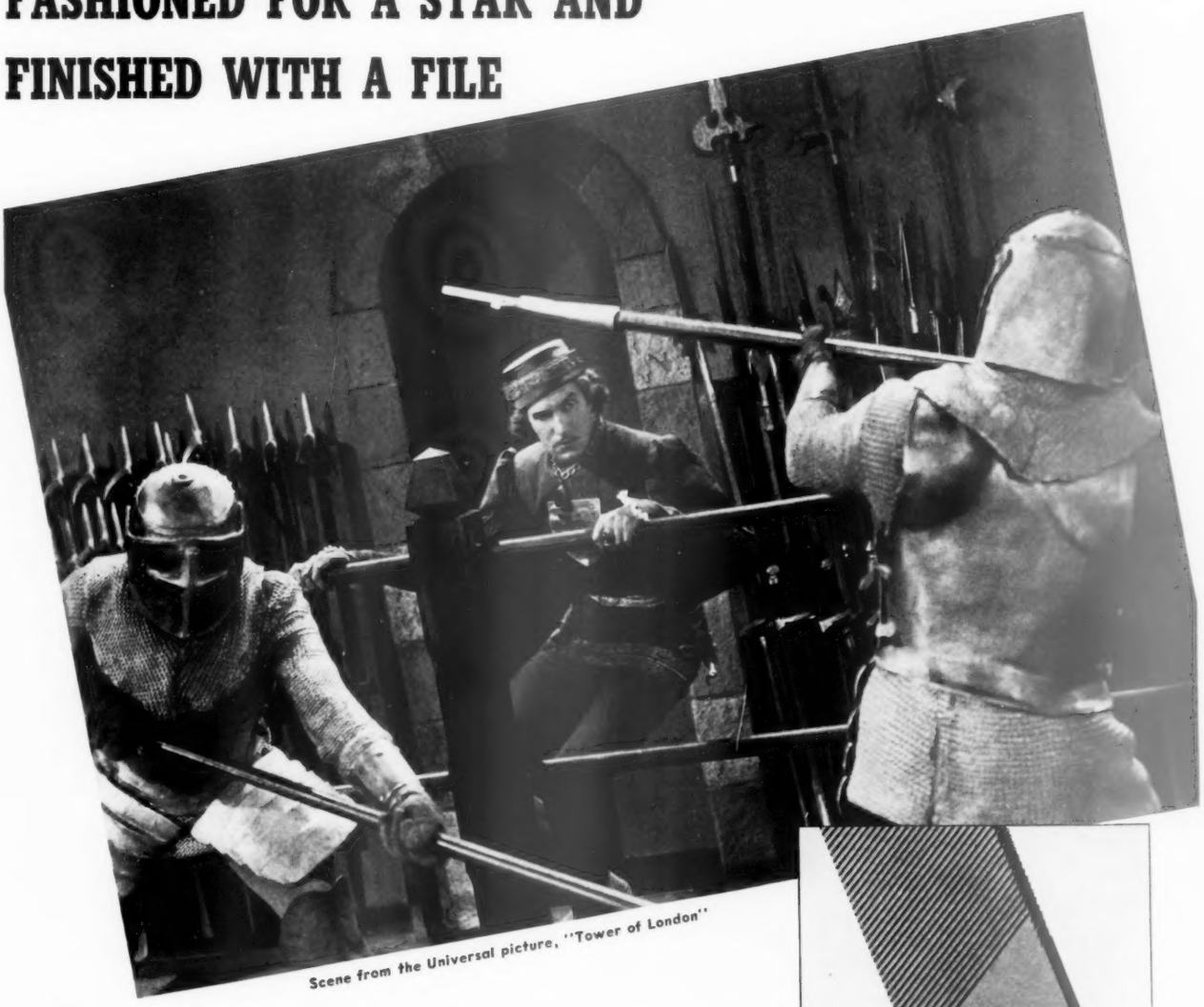


Scene from the Universal picture, "Tower of London"

BUSY hammers strike shimmering metal and gentle files polish delicate edges. You might be in merrie England of four hundred years ago. But, rubbing your eyes, you realize you are in Hollywood, land of surprises.

- ***Time:*** The present.
- ***Scene:*** Universal's "Armorers' Department" of skilled craftsmen.
- ***Action:*** They fashion the suits of aluminum armor which Basil Rathbone and Ian Hunter wear in the famous picture, "Tower of London."
- ***Files by Nicholson!***

To produce a file for the delicate job of finishing armor or repairing a watch is one thing. To produce files strong enough for heaviest, toughest industrial use is another. Nicholson does both — with equal skill!

Nicholson Files are uniformly fine-grained and flawlessly hardened. So relentlessly and minutely is each step in the production of Nicholson Files controlled, that *every* Nicholson File can be depended on to give its user the highest possible efficiency.

There's a Nicholson File for every machine-shop, foundry, pattern-shop or assembly-line purpose. There's a Nicholson service organization available to aid any large-production concern in selecting the right file for every job. And, there's a standing Nicholson guarantee of *"Twelve perfect files in every dozen."*

NICHOLSON FILE COMPANY
Providence, Rhode Island, U. S. A.
Canadian Plant, Port Hope, Ontario

NICHOLSON FILES

FOR EVERY PURPOSE

NICHOLSON U.S.A. MADE IN U.S.A.

For additional products see Buyer's Directory, page 107

Yours ON REQUEST

• New catalogs and bulletins to keep the purchaser informed on industrial products.

ciency. It functions as a large capacity trap with the additional feature that flow of condensate is continuous rather than intermittent.

43– HOISTS—Advanced design hoists including trolleys, spur gear chain, differential chain, ratchet lever, spur gear gravity, electric hoists, utility maintenance tools and load binders, are described and illustrated in Coffing Hoist Co. catalog. These hoists are safe in operation, modern in design and economical to use. Photographs of typical installations in diversified fields are included as well as prices and specifications.

44– GUIDE POST COVERS — Protect operator, work, die-press. Prevent accidents and wrecks by installing safety guide post covers, manufactured by Danly Machine Specialties, Inc. Units are available for any die or service. They are easy to select and order and easy to attach or remove.

45– FLOOR RESURFACER—Stop accidents, delays, lost profits. Fix broken floors now. Ruggedwear resurfacer, product of Flexrock Company, repairs rough, worn broken places in concrete to a tough, feather edge. Under strain of heavy production, holes or broken places can be repaired, or entire floors can be resurfaced in a minimum of time, with excellent results.

46– RECORDING THERMOMETERS—40-page booklet describing a complete line of recording thermometers for every industrial use, has been issued by The Foxboro Company. It is illustrated with photographs of thermometers, their parts and accessories, and installation details. Principles and construction of the Monotherm system incorporated in all their recording thermometers are explained in detail.

47– SYNCHRONOUS MOTORS—The efficiencies of synchronous motors are uniformly high. They operate at constant synchronous speeds at loads within their capacity. For low-speed drives, they have the advantage of relatively low first cost combined with saving in space and, in some cases, with the elimination of gears that must be used with high-speed motors. Whether or not a synchronous motor is chosen depends on an evaluation of the following economic factors: operating efficiency, operating power-factor, constant speed, space requirements, initial investment and service facilities. Product of General Electric Company.

48– BATTERIES—A complete line of storage batteries for passenger cars, trucks, bus and Diesel engines and radios is described and illustrated in The B. F. Goodrich Company catalog. Glasstex mats double the life of these batteries, and non-flood devices prevent over-filling. They are "super-charged" for instant starts and all the extras.

49– ACCESSORIES—An accessory catalog for Gorton machines, is offered by George Gorton Machine Co. Practical ideas for enlarging the usefulness of your machines and improving operating methods are shown, as well as prices on all items listed, including cutter grinders and graduating machines.

50– WIRE ROPE—The purpose of the pocket size handbook published by the Hazard Wire Rope Division of American Chain and Cable Co., Inc., is to furnish in compact and convenient form basic information regarding wire rope. Materials, constructions, lay of strand, preforming, rope centers and coverings, all receive attention as they have a direct influence on flexibility, utility, wearing quality, etc. A careful study will enable those who buy, specify or use wire rope to more intelligently determine the most suitable product for their particular requirements.

51–GEAR OILS—Vital E. P. gear oils are made in a full range to meet the requirements of speed reducers, all forms of gear sets and automotive transmission systems. The table of physical properties and uses of these oils, shown in a leaflet offered by E. F. Houghton & Co., summarizes the principal characteristics to which they rigidly adhere in manufacture and inspection by their control laboratory.

52– BAROMETRIC CONDENSER—A bulletin covering its disc-flow, counter-current type barometric condensers, has been released by Ingersoll-Rand Company. The bulletin is very complete and contains in addition to a description of the condensers and their advantages, diagrams showing their operation, complete specifications, suggested arrangements, and auxiliary equipment usually used with them.

53– AERATION—A bulletin issued by International Filter Company, discusses the purifying functions of aeration and describes and illustrates the various types of aerating equipment available. Aeration performs valuable functions in removing undesirable gases and odors and in oxidizing or adding dissolved oxygen to the liquid. It provides that fresh taste so desirable in drinking waters, and is essential in the treatment of certain brines and other liquids.

54– DUPLICATOR PAPER—A specially developed surface to facilitate speed and ease in handling and to give a maximum number of clean, sharp, legible copies, is claimed for the duplicator paper manufactured by the International

READING-PRATT & CADY
VALVES
Primary Products of American Chain & Cable

ACCO TRADE MARK

OTHER ESSENTIAL PRODUCTS OF AMERICAN CHAIN & CABLE COMPANY, Incorporated

★

CHAIN—Weed Tire Chains
Welded & Weldless Chain & Attachments
AMERICAN CHAIN DIVISION

CABLE—Tru-Lay Preformed Wire Rope and Crescent Non-preformed Wire Rope
AMERICAN CABLE DIVISION

BRAKES—Tru-Stop Brakes for Trucks & Buses
Tru-Level Oil Controller
AMERICAN CABLE DIVISION

CUTTING MACHINES—Wet Abrasive Cutting Machines—Nibbling Machines
ANDREW C. CAMPBELL DIVISION

CHAIN BLOCKS—and Trolleys
FORD CHAIN BLOCK DIVISION

WIRE ROPE—Lay-Set Preformed Wire Rope —Nonparell Non-preformed Wire Rope
HAZARD WIRE ROPE DIVISION

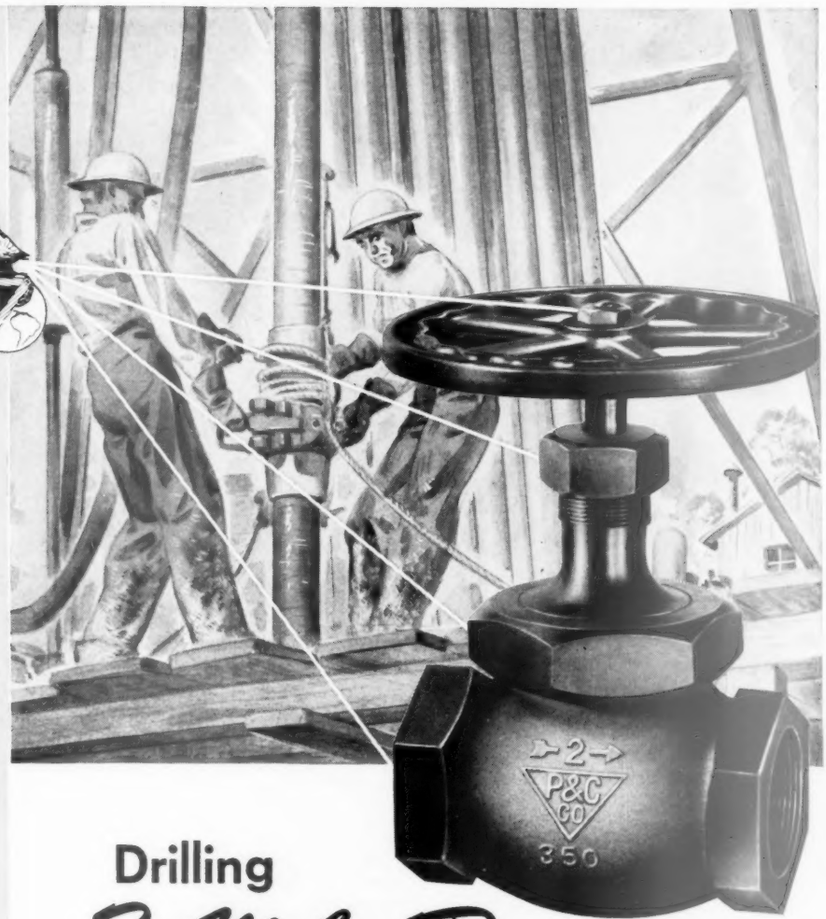
AUTOMOTIVE EQUIPMENT—for garages and service stations
MANLEY MANUFACTURING DIVISION

SPRINGS—Owen Springs and Units for Mattresses and Furniture
OWEN SILENT SPRING COMPANY, INC.

FENCE—Page Fence, Wire and Rod Products, Welding Wire
PAGE STEEL AND WIRE DIVISION

CASTINGS—Electric Steel Castings and Malleable Iron Castings
READING STEEL CASTING DIVISION
AMERICAN CHAIN DIVISION

HOISTS and CRANES—Wright Chain Hoists, Electric Hoists, Cranes
WRIGHT MANUFACTURING DIVISION



Drilling *3 Miles Down*
Demands Dependable Valves

● Oil men sinking wells to depths never before attempted—down to 15,000 feet—found just the valve they needed in Reading-Pratt & Cady's 431 P. It's doing its chore daily, handling 350 pounds of steam superheated to 550° F. • Reading-Pratt & Cady welcome the difficult and unusual valve job. • That's why many business leaders, when faced with baffling mechanical obstacles, specify without hesitation Reading-Pratt & Cady Valves and other American Chain & Cable products—137 in all. A number of these are listed in the Index to ACCO Quality at the left. • ACCO goods and service offer these advantages—the fast-moving adaptability of the small company plus the resources of the large organization.

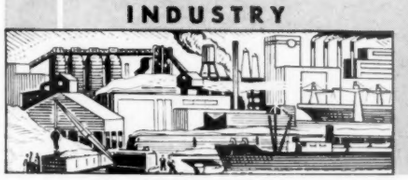
ACCO TRADE MARK

READING-PRATT & CADY DIVISION
In Business for Your Safety

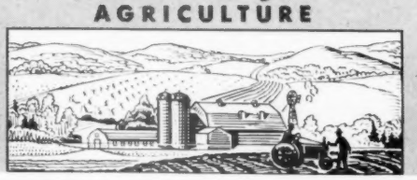
AMERICAN CHAIN & CABLE COMPANY, Inc. BRIDGEPORT CONNECTICUT

Serving

INDUSTRY



AGRICULTURE



TRANSPORTATION

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Yours ON REQUEST

• **New catalogs and bulletins to keep the purchaser informed on industrial products.**

Paper Company. It is excellent for gelatin and liquid (spirit) duplicating work, has unusual strength, and may be had in various sizes, weights and colors.

55– BRONZE BEARINGS—A catalog covering a new size listing of Johnson Bronze Company Ledaloyl self-lubricating bearings is now available. There are now more than 850 stock sizes on hand for immediate delivery. In addition to listing these sizes, part numbers and prices, considerable technical and application data is included.

56– SPHERICAL SURFACE COMPARATOR—A comparator, specially designed for inspecting spherical surfaces, such as those of balls used in precision ball bearings, is being distributed by Jones & Lamson Machine Company. This comparator makes the inspection of these surfaces a very simple, yet exact procedure without the necessity for highly skilled operators and with great economy of time.

57– THREADING MACHINE—The 4 spindle semi-automatic threading machine, manufactured by the Landis Machine Company, Inc., is a precision machine designed for the threading of automotive parts, bolts, studs, rods, etc., on a high production basis. It is semi-automatic in its operation, the manual labor being confined to merely loading and unloading the grips as they automatically open and close.

58– OFFICE RECORDS— A catalog of the record-keeping equipment most commonly used in modern business offices, such as loose-leaf, bound books, forms, sheets and pads, has been released by the National Blank Book Company. It points out improved ways to save valuable time in nearly every department of a business. It will pay you to inform yourself.

59– PYROMETERS— To show some of the specialized temperature measuring problems to which rayotube detectors are now being applied, Leeds and Northrup Company has issued a 40-page catalog entitled "Micromax and Speedomax Rayotube Pyrometers." It pictures rayotubes in a variety of applications detecting temperatures of work in motion rod-stock hot-rolling, work passing through continuous heat-treat furnaces, and rails on the rolls.

60– GATE VALVES—An 8 page circular shows the complete line of Lunkenheimer gate valves with drain channels and bronze thread bushing in bonnet. Valves are available in iron body with bronze trim for steam, oil, gas, air, water and gasoline service and with various alloy trims for corrosive services.

61– CHAINS— Standard types of Moline Malleable Iron Company chains and chain attachments, are fully described and illustrated in a 134 page catalog. They are widely used in elevating, conveying and power transmission services throughout all industry. Special castings to customer's orders, using existing patterns or those made exactly to customer's blue-print, include large pieces and small, ranging from giant truck and bus jacks to tiny pipe plugs and builders' hardware.

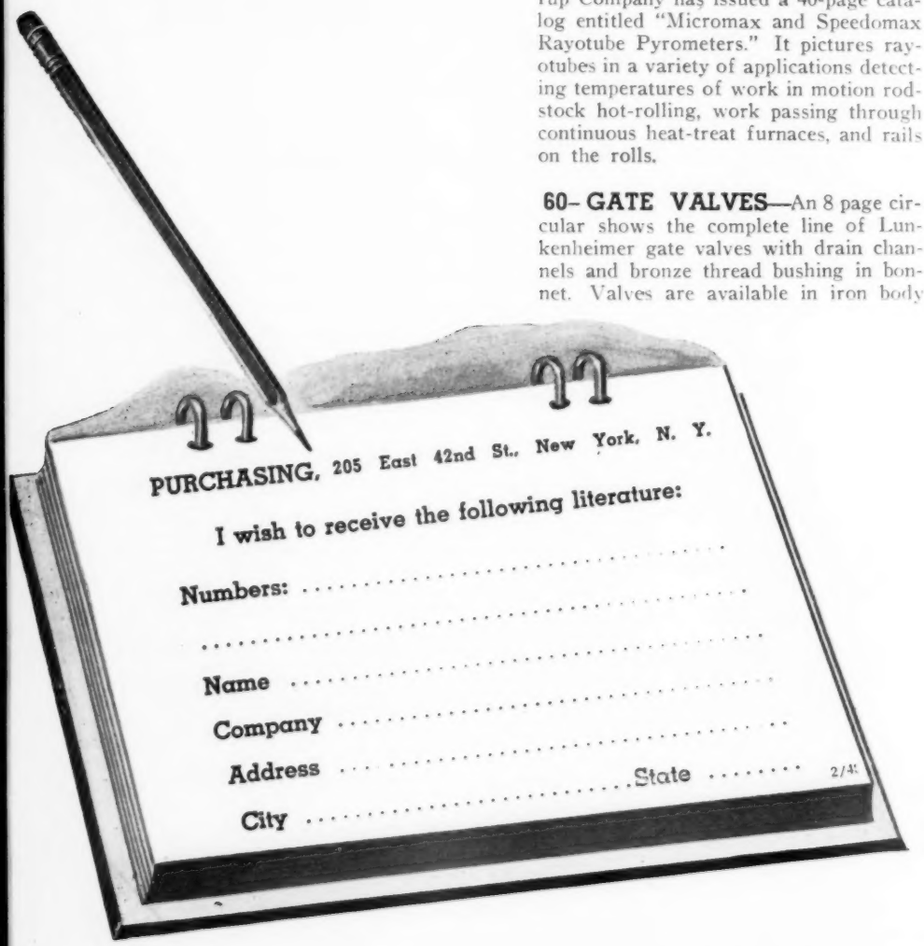
62– FILES—Quality files for every industrial requirement are manufactured by Nicholson File Company. A special file is available for the use of stainless steel and other alloy steels, as the chromium and nickel content of these steels make them tough and dense, and causes them to have an abrasive action that tends to shorten the life of the general purpose file.

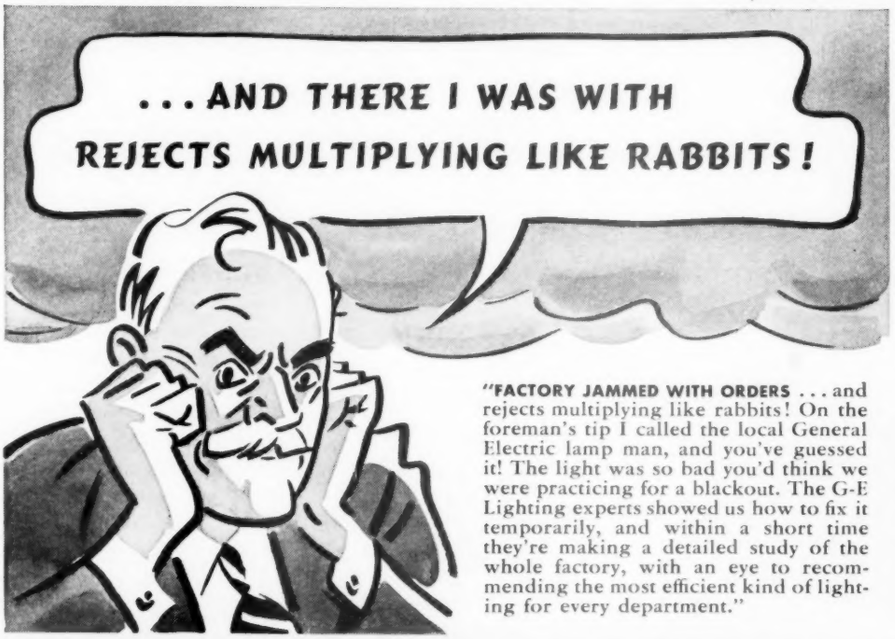
63– VENTILATING BLOWER—A general purpose blower or exhauster for general ventilating, air conditioning, and fume exhaust has been developed by B. F. Sturtevant Company. These fans are of the centrifugal type with direct connected motor. Central feature is the radial blade fan rotor which permits higher rotative speeds, lower outlet velocities and more dependable balance when handling air which contains grease or solid particles.

64– BALANCER— If it isn't balanced right, it isn't balanced at all. Balance the product easier, faster and more accurately on a Taylor Manufacturing Corp., static universal balancer. Today's balance determines tomorrow's speed. Eliminate vibration and your product is better. Any accurate balancing operation necessitates balancing three major units, the beam, the adapter and the work.

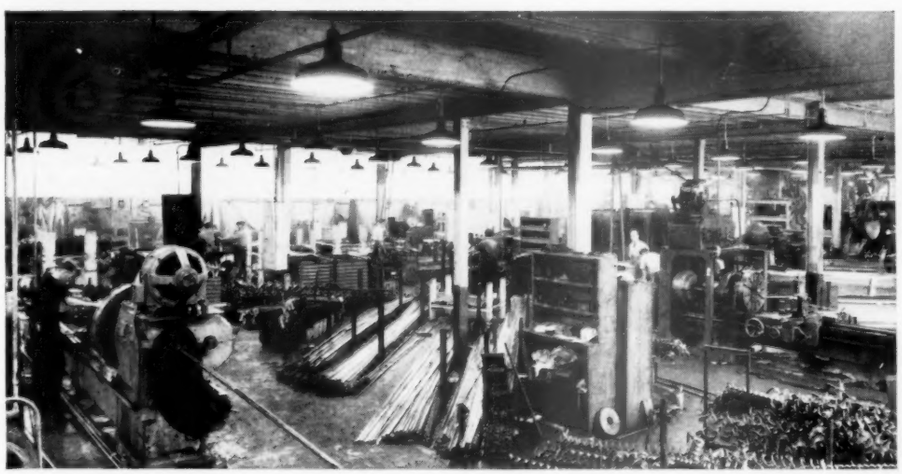
65– WRENCHES— Unbreakable handle and jaws "drop forged" from chrome molybdenum manganese and nickel safety steels is the claim of the Trimont Mfg. Co. for their wrenches. Every wrench carries a written guarantee covering the complete wrench. Cut your pipe wrench costs. Assure more safety to your men. A 45° metal angle chart will be sent without cost upon request. It will save time on all pipe installations.

66– CARBON PAPER—A carbon paper that will not curl or smudge, has extra service manifolding qualities, yet is exceptionally long wearing, is offered by John Underwood & Co. It boasts of a cut-out at center of left margin of each sheet and an uncoated tab extending from center of right margin, enabling the carbon to be pulled out in a single, swift, non-finger-soiling operation.



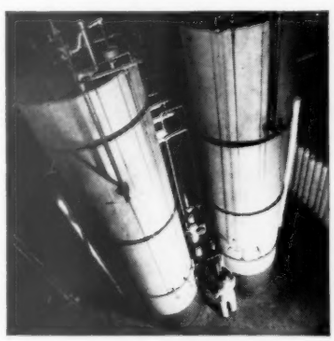


"FACTORY JAMMED WITH ORDERS . . . and rejects multiplying like rabbits! On the foreman's tip I called the local General Electric lamp man, and you've guessed it! The light was so bad you'd think we were practicing for a blackout. The G-E Lighting experts showed us how to fix it temporarily, and within a short time they're making a detailed study of the whole factory, with an eye to recommending the most efficient kind of lighting for every department."



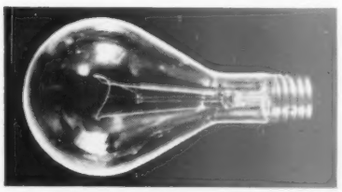
WITH GOOD GENERAL LIGHTING in a plant, machines and benches can be arranged or rearranged for the most efficient plant operation. The above photo shows a good lighting installation in the plant of the Iron Fireman Manufacturing Co., Cleveland. This plant uses 300 watt G-E MAZDA lamps in RLM dome reflectors, spaced on 11-foot centers, to provide good light for safe seeing and more efficient work. Use the new, brighter G-E MAZDA lamps in your plant.

304° BELOW ZERO . . . The two tanks shown here contain argon, the inert gas used to help make incandescent G-E MAZDA lamps stay brighter longer. The drier the argon, the more efficient the lamp. Moisture in the argon is frozen out with liquid air at a temperature of -304° F. This year's G-E MAZDA lamps give more light because they contain a higher percentage of this drier argon. This process is only one link in the chain of General Electric research and development that is making each year's G-E lamps give more light for the current consumed. General Electric Company, Dept. 166- P-B, Nela Park, Cleveland, O.

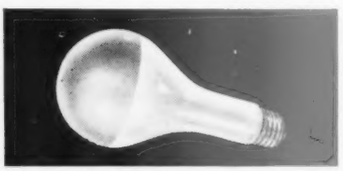


G.E. MAKES 9000 DIFFERENT LAMPS *for every* LIGHTING PURPOSE

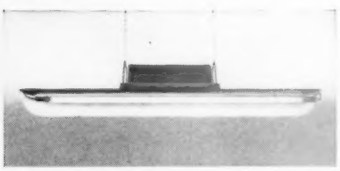
Whether you make waste baskets or silk hose, G.E. is the place to go for help on making your lighting a real aid to production. Because G.E. makes more than 9000 different types and sizes of lamps, our lighting experts can give you an unbiased recommendation on exactly which ones you need and where.



G-E MAZDA lamps fulfill most industrial requirements for general lighting service. They are made in sizes from 15 up to 1500 watts.



G-E SILVERED BOWL MAZDA lamps are standard incandescent lamps with a coating of "mirror" silver on bowl. For soft indirect lighting . . . in proper fixtures or adaptors.



RF 85 WATT (COOPER HEWITT fluorescent) lamps—100 watts overall—give the greatest light output of any lamp of equal wattage. Long life . . . low operating cost . . . less maintenance.

G-E MAZDA H (mercury) lamps . . . 400 watt size shown . . . have high efficiency, long life, and ruggedness. Very practical for high bay areas. Often used in combination with filament lamps.

NEW G-E "MIDGET SUN", a 1000-watt, water-cooled mercury lamp, is brightest ever made. It is 1/5 as bright as the sun's surface, yet no bigger than a cigarette.

G-E MAZDA LAMPS

GENERAL ELECTRIC

Made to stay brighter longer

For additional products see Buyer's Directory, page 107

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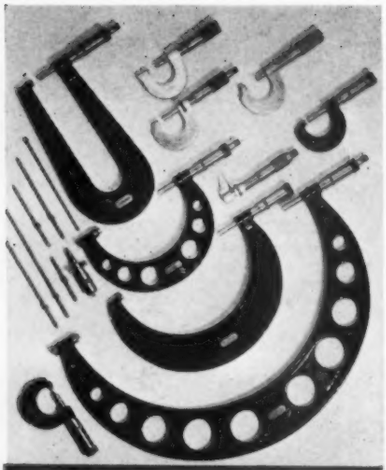

STARRETT MAKES IT

The completeness of the STARRETT line is only one of the many STARRETT advantages. Whether it is a micrometer, vernier, indicator or any other type of precision tool, you'll find that STARRETT makes it—and makes it the way you want it. Save time and trouble — select the tools you need from Starrett Catalog No. 26-P and order them from your regular mill supply dealer. If you haven't a Starrett Catalog, write for one.

THE L. S. STARRETT CO.
World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
Steel Tapes—Standard for Accuracy
Dial Indicators for Every Requirement
Athol, Mass., U. S. A.

Standardize on
STARRETT TOOLS
Buy Through Your Distributor

F.O.B. filosofy of buying

THIS month's assist is credited to Frank Carter of the Maryland Dry Docks Co., who sends us the following clause which was typed on a quotation submitted to his company:

> "Prices are for immediate acceptance and this quotation is subject to strikes, fires and other causes beyond our control, and is subject to correction for clerical errors in estimating."

After re-reading the final condition, he properly classified the proposal as "no bid" and so advised the supplier. The latter explained that his company was very busy these days and hesitated to take the responsibility for estimates made in haste and under pressure. However, being unable to convince the prospect that this was any part of his responsibility as a buyer, he reluctantly withdrew the qualification. It seemed like a good idea, and perhaps he shouldn't be blamed for trying, but it's one more example of the importance of reading the "fine print."

● ●

Of course it was all in fun, but at a recent meeting of mill supply men in Cincinnati one of the boys burst forth in song, to the tune of "Clementine":

Ten per cent more
Ten per cent more
Ten per cent more on your line.
If you can't give
Ten per cent more
Five per cent more will be fine.

● ●

F. O. B. recently had occasion to drop in at the New York offices of the British War Purchasing Commission, and was agreeably surprised to find two old friends of the N.A.P.A. at responsible desks in that busy organization—Harrison Henry, long time member of the New York Association during his years of service as a buyer with the Western Electric Co., and W. L. Fellows, past president and honorary life member of the Eastern New York Association. Henry, who was called out of retirement to organize the purchasing staff last fall, had the unusual experience of finding a hundred and fifty salesmen waiting in the lobby before him when he arrived on the opening day, with no personnel, no forms, and no established system to take care of the situation. A seasoned buyer, he quickly met the emergency by recruiting four men from the Cunard Line offices downstairs, experienced in meeting the public, and installed them in his office as observers while he personally conducted the first interview. With that brief and intensive training, they were installed in separate offices, on their own, and the real job of interviewing was under way. Before the week was out, the congestion in the lobby had been cleared, an adequate staff of more permanent nature had been assembled, and a comprehensive record system installed. The office today is as orderly a purchasing organization as you are likely to find anywhere, with a very favorable record of receiving its numerous business callers promptly, courteously, and efficiently.

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Buying at the right time, one of the cardinal points of good purchasing practice, was strikingly exemplified by the North Carolina community which blandly changed President Roosevelt's birthday from January 30th to the 29th, for the very good reason that an orchestra for the birthday ball could be engaged on a much more favorable basis than on the following evening when the country at large was celebrating and swing musicians were at a premium. Cited as precedent for thus taking liberties with the calendar was the President's own switch of Thanksgiving, 1939, also "for economic reasons."

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